

COMPUTER WORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

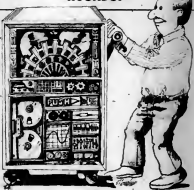
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COMPUTERWORLD'S ANNUAL HARDWARE ROUNDUP



This Week Beginning on Page 29:
**A Survey of 159 Mainframes
And Superminis From 26 Vendors**
Coming in the Next Two Weeks: Minis and Micros

Curtain Falls On Withholding

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Congress has finally brought down the curtain on the long-running drama surrounding the attempt to repeal the dividend and interest withholding regulation that was scheduled to go into effect Aug. 5.

By overwhelming majority votes July 28, the House of Representatives and the Senate passed a compromise bill heading off implementation of 10% withholding at the source for payments to stockholders and customers of corporations and financial institutions. To make the repeal acceptable to the administration, which had supported withholding, Congress acted to step up enforcement of existing withholding regulations and increased penalties for those who violate them [CW, Aug. 1].

At press time, the repeal legislation had not been signed by President Reagan, even though the withholding regulation had been slated to go into effect last Friday. But at that point, Reagan's signature was no more than a formality: the U.S. Treasury said that congressional approval of the bill effectively killed the withholding regulation.

Chasing Wafer, DEC Buys Into Trilogi

By Bill Laberis
And Ed Scannell
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. last week purchased a 9% stake in Trilogi Ltd. that gives the minicomputer giant the option to license Trilogi's untested but promising wafer technology.

DEC's \$26 million investment marks the first time the company has bought an equity interest in another company. The agreement not only gives DEC the option of incorporating Trilogi's circuit technology into what most industry analysts predict will be the next generation of VAX-11 superminicomputers, but also the option of having Trilogi build a semiconductor manufacturing facility that would produce the chip for DEC's products.

For its part, Trilogi received another major financial transfusion, swelling the amount its founders have raised to date to about \$260 million. The company has yet to produce anything for sale and is not expected to do so until 1985, when it intends to market an IBM-compatible mainframe using its wafer technology and capable of processing 32 million instructions per second.

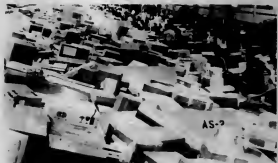
The semiconductor facility that Trilogi would build at DEC's option, would supply DEC with Trilogi-de-

signed circuits. Trilogi, however, would be left with the option of striking similar OEM agreements with other vendors competing in non-IBM-compatible markets.

Trilogi, established in 1980 by Amdahl Corp. founder Gene Amdahl, wants to market its wafer tech-

nology to noncompeting companies like DEC in exchange for both investment capital and outside technical assistance in expanding the applications for Trilogi's new chip design, a company spokesman noted. Any enhancements to the chip de-

(Continued on Page 8)



Package Switching

Federal Express Corp. sorts 200,000 boxes and envelopes every night between midnight and 2 a.m. at its Memphis "superhub." To deliver on its promise that all those packages will be delivered by 10:30 a.m. the next day, the company invests \$24 million in its communications networks annually. Story on Page 10.

AT&T Accepts Changes In Reorganization Plan

By Phil Hirsch

CW Washington Bureau

NEW YORK — The last major obstacle to the breakup of the Bell system was removed last week when AT&T announced here that it has accepted the changes in its reorganization plan demanded by U.S. Federal District Court Judge Harold Greene as a result:

- AT&T will no longer use the Bell name or logo except to market products or services abroad and to identify its research arm, Bell Laboratories. Otherwise, the Bell operating companies will have sole rights to these items. After divestiture of the 22 operating companies, AT&T will use a lined globe — the current monogram of American Bell, Inc. — accompanied by its familiar AT&T logo.

American Bell is being renamed AT&T Information Systems, Inc., and the Long Lines Division has become AT&T Communications. AT&T Board Chairman Charles Brown reported at last week's press conference here.

- AT&T will grant the Bell operating companies royalty-free, nonexclusive licenses to all its existing pat-

- AT&T and MCI Communications Corp., often in different camps, find themselves united in their opposition to congressional attempts at restructuring communications rates. Story on Page 4.

- A half-million Bell system employees were poised to go on strike at press time last week. How would a strike affect telecommunications services? Page 5.

- American Bell, Inc. last week announced a smaller version of its Dimension 600 PBX. Page 5.

ents; as well as to those it receives during the five years following divestiture. The operating companies will be able to sublicense their suppliers, thus enabling the competitors of Western Electric — AT&T's manufacturing arm — to exploit Bell system technology. This has been a major goal of the competitors.

- AT&T guaranteed to repay the operating companies for certain network reconfiguration expenses they

(Continued on Page 4)

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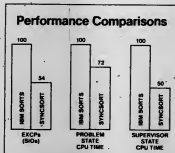
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AT&T Agrees to Changes In Reorganization Plan

(Continued from Page 1)
incurred between now and 1994 as a result of divestiture. The reorganization plan provides that these expenses are to be recouped from access charges levied by the operating companies on long-distance carriers. The guarantee applies if the access charges turn out to be inadequate.

Although it now appears that AT&T can complete the divestiture process next Jan. 1 as planned, it is still unclear what AT&T Communications, Inc. (the former Long Lines Division) will charge for private-line and other services.

The same question mark hangs over other providers of long-distance communications service. All of these providers are awaiting the outcome of the current battle in Congress over the Federal Communications Com-

mission's (FCC) access charge decision.

That decision, scheduled to become effective Jan. 1, will shift several billion dollars in network costs from long-distance users to users of local exchange networks. Local rates will go up as a result, and the presumption is that long-distance rates will come down. But the long-distance carriers have avoided making any promises.

Bills Would Cancel Decision

Meanwhile, bills have been introduced in Congress that would cancel the FCC decision and continue the present scheme, under which long-distance carriers pay a substantial percentage of their revenues to local telephone operating companies. The money covers the local carriers' costs of providing access to the long-distance carriers' networks and provides a subsidy that reduces communications charges to rural subscribers.

At last week's press conference here, AT&T Chairman Brown said it is "very important" to implement the access charge decision in its present form. Asked whether there is any basis for a compromise between the opposed views of Congress and the carriers, he said that the pending legislation has generated a "series of objections, and he expects to see changes in the bills."

In his prepared remarks, Brown stressed that "the new AT&T is a new enterprise, a new state of mind (and) a new business." There will be increased effort to sell abroad and to

AT&T Chairman Fields Questions

NEW YORK — Will rates for communications services rise next year? "Not because of AT&T," AT&T Chairman Charles Brown responded at AT&T's press conference here last week. Any increase in communications services rates, he added, would be due, at least partly, to the Federal Communications Commission's access charge decision, which shifts costs to local network users from long distance users.

Brown's remarks came during a question-and-answer period that followed the prepared portion of the press conference, called to announce AT&T's acceptance of the changes in the company's reorganization plan demanded by U.S. Federal District Court Judge Harold Greene.

In response to another question on pending legislation, Brown said that "no proposals to retain the long-distance subsidy are workable." Asked whether there is any basis for a compromise between Congress, which supports this subsidy, and those who oppose it — chiefly, the carriers and business communications users — Brown replied that there are "no many objections to the legislation. I expect it will be changed."

Brown was then asked whether AT&T could accept continuation of the present separations/settlements process. His answer: The Bell operating companies "would continue to suffer from bypass."

Regarding AT&T's ability to compete internationally, "we expect to do quite well," the agreement with N.V. Philips [a huge Dutch electronics manufacturer] will give us a big leg up," The Philips agreement, announced last week, will enable the two companies to make and market together AT&T switching and transmission equipment outside the U.S.

Asked why AT&T had decided to accept Judge Greene's terms, the AT&T chairman said the "alternative would be more years of uncertainty. It's necessary to get the decks cleared and end that uncertainty."

U.S. vs. AT&T at a Glance

Nov. 20, 1974: Representing the U.S. government, the Justice Department files an antitrust suit charging AT&T, its subsidiaries and operating companies with multiple violations of the Sherman Antitrust Act and proposes breakup of the Bell system as the chief remedy.

Sept. 11, 1978: Presiding Judge Harold Greene sets up a schedule for pretrial depositions.

Jan. 5, 1981: AT&T and Justice Department attorneys agree on a "concept" that might lead to a settlement.

Jan. 15, 1981: The oral phase of the trial begins.

March 23, 1981: Defense Secretary Caspar Weinberger urges the government to drop the suit because, he maintains, forcing AT&T to divest the Bell operating companies would weaken national security.

April 10, 1981: Assistant Attorney General William Baxter vows to litigate the suit "to the eyeballs."

Aug. 10, 1981: Baxter tells the Senate Judiciary Committee that the Justice Department will drop the suit if acceptable legislation is passed.

Sept. 11, 1981: Judge Greene refuses to dismiss the bulk of the government's charges against AT&T and indicates that the Justice Department has proven AT&T

guilty of violating the Sherman Act.

Jan. 8, 1982: AT&T and the Justice Department announce agreement on a Modified Final Judgment settling the case.

Aug. 11, 1982: Judge Greene issues a 178-page opinion accepting the proposed judgment with changes. The changes are accepted by AT&T and the Justice Department on Aug. 19.

Oct. 4, 1982: AT&T begins implementing the judgment by submitting a plan to Greene defining the new territories — officially known as Local Access and Transport Areas (LATA) — which the divested Bell operating companies will service.

Dec. 16, 1982: AT&T files a reorganization plan describing how the breakup of the Bell system will be carried out.

April 20, 1983: Greene approves with changes AT&T's LATA plan. AT&T and the Justice Department, accept the changes shortly thereafter.

July 4, 1983: Greene approves the reorganization plan with changes.

Aug. 3, 1983: AT&T and the Justice Department accept the Greene-amended reorganization plan.

Jan. 1, 1984 (Projected): The Bell operating companies are divested from AT&T.

market computer-based products and services.

AT&T must "redefine our corporate mission — from leadership in

the telephone business to competitive leadership in the information age. And we recognize that the competition is global," Brown said.

Not Often in Same Camp, But ...

AT&T, MCI Oppose Rate Restructuring

By Phil Hirsch
CW Washington Bureau
WASHINGTON, D.C. — MCI Communications Corp. and AT&T disagree about almost everything, but late last month it became clear they agreed about one thing. They both oppose the latest congressional attempt to restructure communications rates.

In the same camp are the Federal Communications Commission (FCC), the soon-to-be-divested Bell operating companies, the largest independent telephone carrier (GTE Corp.) and the largest communications user group (the International Communication Association).

In the opposite camp, however, are the National Association of Regulatory Utility Commissioners, which represents state regulators, and assorted consumer protection groups.

Transferring Net Costs

Representatives of all of these groups appeared at two days of hearings conducted jointly by the Senate and House Commerce committees late last month. The subject was two bills introduced a short time earlier which would prevent the FCC from transferring several billion dollars in network costs from long-distance users to all users of the telephone network.

The commission's ruling, announced initially last December and modified last month (CW, Aug. 1), is scheduled to become effective Jan. 1. It will raise rates \$4/mo for business subscribers and \$2/mo for residential subscribers in 1984. The additional funds will help repay local telephone carriers for the expenses they will incur in providing access to the long-distance telephone network. They will also help subsidize telephone service to high-cost rural areas.

The balance of the funds needed for those purposes will be collected from private-line users and from MCI, GTE, AT&T's Long Lines Division and other long-distance interexchange carriers.

Underlying the FCC decision is the concern that if long-distance users pay all of these costs — which will total an estimated \$10.7 billion next year — long-distance rates will skyrocket, business users will shift their traffic to bypass facilities and local telephone companies will suffer a major loss of revenue.

According to sponsors of the recently introduced bills, however, there are other ways to curb the use of services that bypass the telephone network. They insist that the FCC's scheme, by raising rates for local telephone subscribers, will jeopardize

the universal telephone service that today interconnects virtually every household and office in the country.

The four most influential telecommunications policymakers in Congress are Sen. Bob Packwood (R-Ore.) and Sen. Frank Lautenberg (N.J.), who are sponsoring S. 1660, one of the recently introduced pieces of telecommunications legislation; and Rep. John Dingell (D-Mich.) and Rep. Tim Wirth (D-Colo.), who are sponsoring the other measure, H.R. 3621.

No Convincing Evidence

One problem handicapping them — as well as the legislation's critics — is that no one has any convincing evidence showing what the impact of the FCC's access charge decision will be.

Eric Schneiderwind, chairman of the Michigan Public Utilities Commission, predicted at the hearings that rates in his state would "double within the next 12 months." But AT&T, in a statement issued at about the same time, maintained "there could be a reduction in long-distance rates of as much as 10% to 15%... It is AT&T's intention to reduce interstate rates as much as possible, consistent with meeting its earning needs."

'War Games' Anticomputer? 'No Way,' Say Hit

Is War Games an anticomputer film?

Lasker: No way. When we wrote the script, we got very turned on to the idea of what you can do with computers. It was sort of an eye-opener.

Parkes: I think the movie is critical of the ways in which computers are used by certain members of the population. But what it tries to dramatize in the character of David Lightman is a new generation of computer user who enjoys a more symbiotic relationship with computers.

What is your response to criticism of the technical inaccuracies of the film?

Lasker: The film was made for as broad an audience as possible. People who don't understand that are a little more critical about some of the

Can a movie about a brush with global thermonuclear war leave you feeling good? Millions of movie-goers who have viewed War Games have found that it can.

One of this year's most popular motion pictures, War Games is about a teenage computer whiz, David Lightman, who unintentionally taps into the central computer located at the North American Air De-

fense Command and starts the machine playing a strategic game of nuclear warfare against itself.

Through a twist of the plot, the computer has recently been given control of the U.S. defense forces. The film concerns Lightman's efforts to stop the computer as it methodically plays out its catastrophic scenario.

While War Games has

drawn criticism for its technical flaws (see story below), it has also inspired much debate in the computer community, making celebrities out of screenwriters Larry Lasker and Walter F. Parkes.

Lasker and Parkes were interviewed for their Hollywood studio last week by Computerworld Senior Writer Paul Gallin.

inaccuracies.

Parkes: It seems like the top people in various fields are quite willing to overlook some of the technical inaccuracies and anxious to get behind

some of the central issues of the film in terms of human responsibility for technology. Others in the field, I think, find it ego-fulfilling to try to nitpick very small inaccuracies that

for the most part were aware of when we were writing the picture.

How did you choose the topic of the movie? At the time you began writing the screenplay, the world was as yet unaware of the alerts that have plagued North American Air Defense (Norad).

Lasker: One of the clips we [encountered] in our research was a small article in one newspaper about a tape of a simulation of a Russian missile attack which had been left in a computer at Norad by accident. The computer was turned on and it displayed the classic pattern of a full-scale surprise attack. It was only about six minutes later that the error was realized. Up until that time, I didn't even know that was possible.

Parkes: We really started with the issue of a gifted kid born into a less-than-supportive environment. We wanted to be sure we presented a kid who wasn't socially backward. Another thing was that the kid would need someone special in his life that would be there as a supporter of his curiosity, the so-called "significant other." Larry and I had the idea then to make that significant other in David Lightman's life his home computer. That turned us to computing.

In War Games, the computer appears to have control over the missiles. But Norad claims it never does.

Parkes: They're quite correct, actually. There were two fictionalizations we did regarding that.

Lasker: For one thing, at the start of the movie, we remove the humans from the launch capsules, but actually, they're key to the system.

Parkes: In the real world, there is a computer system that generates the [Single Integrated Operating Plan (SIOP)], which is the computerized war plan we will follow in the event of a nuclear strike. That is not at Norad but at the Strategic Air Command [SAC]. We merged the commands of Norad and SAC into one command. That's a bit of dramatic license. In the real world, the SIOP machine is not interfaced with any part of the Norad computer network. But it's as good as interfaced. Even though the computer may not be attached to those silos, there is only enough time to follow the plan generated by the computer in the event of nuclear war.

Do you attempt to portray War Games as something that could really happen?

Experts Find 'War Games' Pure Hollywood

By Jim Bartimo
CW Staff

While the popular movie War Games is an exciting adventure film, the idea that a teenager could dial up the North American Air Defense (Norad) Command System computer and trigger a nuclear war is far-fetched, experts told Computerworld last week.

The movie—which strives for re-

alism [CW, Feb. 22]—places a young computer buff in the compromising position of playing video games with real-life nuclear warheads, much to the consternation of the U.S. military.

The main problem with the story line is "there is no telephone connection to Norad, and that's central to the kid getting into the computer," according to Jay Bloombecker, direc-

tor of the National Center for Computer Crime Data in Los Angeles.

Checks Too Complex

Admitting that almost anything is possible with a network as large as Norad's, futurist Charles Lecht of Lecht Sciences, Inc. in New York said: "My real concern is that the checks and balances are too complex to work in the event that the system is really needed."

"There are all kinds of passwords and levels of protection," Lecht noted. "It is not possible to energize those programs and remain transparent to humans."

The third fault in the plot, according to Norad, is that Norad is only a warning system; retaliatory duties are handled by the Strategic Air Command. "We provide information as to whether we're under attack, but we don't deploy any weapons," Col. Fred Watkins, director of public affairs for Norad, pointed out.

"We were approached by the people making the movie," Watkins added. "They showed us the script and asked us to find any inaccuracies. We told them what they were, but changing them would have changed the plot. So they left the inaccuracies in."

False Attack Alarm

Norad recently came in for criticism when a communications multiplexer set off a false alarm of nuclear attack. While this may have been part of the inspiration for War Games, "we've added more humans with voice communications to other humans since then," Watkins said. "We would never take the human factor totally out of the loop."

The elimination of the human factor is the one part of the movie that intrigued Bloombecker, who said society is beginning to leave many decisions to computers. In the insurance industry, for instance, automobile rates are decided almost totally by an algorithm in the computer. "If you live in a certain zip code area, you pay a certain rate."

But, like Watkins, Bloombecker agreed that War Games is only a movie.

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Movie's Screenwriters

Parkes: I don't think it was our intention to present a scenario that could really happen, but rather to create an entertaining fictional scenario that reflected certain real issues. There have been passwords left in, there have been lines left open to a computer system, but it's very unlikely that those events will happen at the same time. However, they continue to happen.

What will happen after the movie ends?

Parkes: These were some of the thoughts we were having for a sequel. I think the approach would be to try to isolate and remove Joshua [the program that plays the game] from the system. But the chances are that the U.S. Defense Department would not learn their lesson. They would probably apply a Band-Aid to a patient that requires more major surgery.

You don't sound optimistic.

Parkes: The nuclear stalemate we are living with has taken 25 years to develop, and anything that's that firmly entrenched is very difficult to break down. Our main approach to ensuring peace has been to have more and more nuclear weapons. To reverse that trend is very unlikely.

Lasker: In the movie, Joshua comes to the conclusion that this game is unwinnable. It seems that the defense policy of our current administration believes that it is winnable.

Computers in recent films have been treated very much as toys. Yours is a serious treatment. Do you think this is a trend?

Parkes: I imagine there will be in that more, and more writers will be growing up in a world that is inhabited by computers. The problem is that in Hollywood, people tend to not want to take the time to understand things before they write about them.

There are so many films where the hero is an anti-intellectual type. When we were writing the movie, we were aware of the rapid rise of interest in science. We had a real sense that we were getting to a movie audience that would be able to embrace an intellectual hero. You also have a movie audience that is becoming increasingly computer-literate.

With what thoughts would you like audiences to leave the film?

Lasker: One is the whole area of the policy that nuclear war is something you can actually plan for and win. Another one has to do with taking responsibility.

Parkes: It seems [audiences] have started thinking about the role and the dependence on computers in our defense establishment. When you think that the warning period from detection of a Soviet missile launch to its confirmation to its impact can be as little as six to 12 minutes, you realize it's not a very big step that more and more of that system has to be automated, that in fact the [information used by the] president who would have the final say would be more and more under the control of a

computer.

What has your reaction been to the considerable success of War Games?

Parkes: One of the nicest responses was when we recently spoke for the Computer Professionals for Social Responsibility. While they knew where the technical inaccuracies and fictionalizations were, they essentially felt the movie was getting at a message that was worth publicizing.

Lasker: There seem to be a number of people in the computer field for whom the movie was an occasion to think about their work in a way they haven't thought about it before in terms of the role of computers in society and the responsibility of those that program them.



Photo Courtesy of Columbia

Screenwriters Larry Lasker (center) and Walter Parkes (right) discuss War Games with director John Radham. The two writers were computer novices when they began work on the screenplay.



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DEC Buys Into Trilogy, Gets Wafer Technology

(Continued from Page 1)
sign made by equity partners like Sperry Corp. or DEC would have to be shared with Trilogy.

Asked if the sale and lease of Trilogy's technology marks a change in the company's original intent to design, build and market a high-performance mainframe, the Trilogy spokesman replied, "Not really. Initially, we believed the semiconductor package and its technology was a means to an end, namely to build a large-scale system."

As Carl Amdahl, vice-chairman of Trilogy, explained, Trilogy will operate as a system foundry similar to a silicon foundry. "What we are doing in the system foundry business is providing customers like DEC with a set of comprehensive software tools that start at the architectural modeling level for large systems and go all the way down to physical design and test-pattern generation," he said.

"We then build the parts, package them in their cooling system, mount them on boards and send them back to DEC. So what we are talking about is more than producing chips; we are talking about a vehicle for producing major system subassemblies."

Evidence of a Trend

Last week's deal was further indication that the bigger computer vendors are following IBM's lead in seeking minority equity positions in other state-of-the-art companies, a trend fueled by the steep research and manufacturing costs of today's advanced systems [CW, June 27]. In the last year, IBM purchased a minority interest in Reim Corp. (15%); Intel Corp. (12%), while DEC now joins Sperry (15%) and France's CIT-Honeywell Bull (7%) in buying shares in Trilogy.

Asked if Trilogy is seeking other vendor investment partners, given Trilogy's continuing capital needs, the company's spokesman replied that several other computer vendors

are interested, "But we are not looking in that direction now."

Likely candidates to buy a piece of the fledgling mainframe company, according to analysts interviewed last week, include NCR Corp., Burroughs Corp. and Honeywell, Inc. Despite the track record of both Gene and Carl Amdahl, most industry watchers feel that DEC, as well as the Amdahls, have placed themselves in a high-risk situation with the agreement signed last week. But if the gamble pays off, most agree it will be a windfall for both parties.

"Obviously, DEC feels the gamble is justified," stated Aaron Goldberg, an analyst for International Data Corp., a market research firm in Framingham, Mass. "Twenty-six million dollars to DEC is not a lot of money anyway. It represents half of 1% of sales."

If the agreement "doesn't pan out," Goldberg said, DEC "will be out \$26 million, but if it does, the research and development costs it will save [DEC] will be huge."

DEC Not Seen Using Wafer In Next VAX

Digital Equipment Corp.'s stock purchase in Trilogy Ltd. last week gives the mini maker a good opportunity to make a healthy profit. But more important, observers believe, DEC is reserving a place for itself on the razor's edge of large-system technology.

While he declined to outline which products will use the new technology, a DEC spokesman said the wafer technology "fits in nicely with our evolving strategy, which is to integrate users of our [Decsystem-10s and 20s] into our distributed processing architecture." He added that

Trilogy Says 40 Wafers Replace 4,000 Integrated Circuit Chips

"This unique approach to high-performance, ultralarge-scale semiconductor devices represents an important breakthrough in circuit integration and packaging that should result in significant improvements in reliability and performance."

With those words, Digital Equipment Corp. President Ken Olsen last week described the performance rewards he expects Trilogy Ltd.'s wafer-scale integration technology to bring to DEC's larger systems.

By placing all the necessary circuitry on a single 2½-in. square wafer instead of wiring hundreds of individual chips to boards, Trilogy contends that it can produce a system far more powerful than today's mainframes for significantly less money — a system that will be fail-safe as well.

"With the ability to put more circuits on a single die, you can keep them [the circuits] closer together and, therefore, lower your communication time," explained Carl Amdahl, vice-chairman at Trilogy and co-developer of the technology. Putting all the neces-

sary circuitry on one chip also produces a much more reliable machine by dramatically reducing the need for highly vulnerable circuit connections.

"Circuit connections, such as chip interconnections to boards, are unreliable parts of the machine. If one can minimize those interconnections, one can build a more reliable product," Amdahl said.

Moreover, because 40 Trilogy wafers take the place of the 4,000 integrated circuit chips needed to build most of today's mainframes, the company has created the room to add extra circuits to the wafer that can diagnose and correct any problem. "There are multiple copies of each circuit on the chip so that the chip itself contains redundant sections of the machine," Amdahl noted. "The redundancy we have developed survives shipment to the customer site; if a transistor should fail, chances are very high that failure wouldn't be seen by the system because it would self-correct. This is what we have termed 'self-repairing technology.'"

the agreement will not affect any current DEC development projects.

One of those projects is the development of a high-end VAX-11 that is not expected to be released until sometime next year. Whether it is this system or the next generation of VAX-11 machines, expected in three or four years, that will incorporate the new technology is a matter of speculation.

"I think the next thing for DEC will be a parallel pipeline architecture for the VAX-11. I don't think they will look to integrate this chip down to the VAX-11 for at least three years," said Aaron Goldberg, analyst for International Data Corp., the

market research firm.

Mike Gerran, vice-president of research for E.F. Hutton, Inc., also feels the wafer technology will not make its debut in the machine expected next year but in the next series of machines. "The Amdahl technology will be in the next cycle. [DEC] won't be able to move that fast to integrate on the next system."

Carl Amdahl, vice-chairman of Trilogy and, along with his father Gene, one of the co-developers of wafer technology, hinted that the technology will not only be used in future products but could be used to "extend the performance range of [DEC's] current product lines."

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Permanent Panel Proposed To Handle Privacy Issue

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A permanent and independent privacy commission to handle domestic and international privacy issues was proposed in legislation introduced in the U.S. House of Representatives last week.

The idea for an independent privacy commission, put forward by Rep. Glenn English (D-Okla.), is not new. English noted that the idea was promoted at the time the 1974 Privacy Act was passed.

It was also recommended by the Privacy Protection Study Commission, which was set up under the 1974 law on a purely temporary basis.

English said the independent commission proposed in his Privacy

Protection Act of 1984 would oversee compliance with the 1974 law and develop privacy guidelines and model regulations.

It would also work with foreign governments and international organizations on various privacy and data protection issues, according to English.

"Oversight of the Privacy Act within the executive branch is virtually nonexistent," English said in explaining the need for the new commission.

Noting that the federal Office of Management and Budget (OMB) has been assigned oversight responsibility under the 1974 law, English said his investigation has found that "in fact, OMB is hardly doing the job at all."

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Based on the methods taught in Structured Programming for the COBOL Programmer, this easy-to-use reference manual gives standards and guidelines for every phase of programming in a COBOL shop. It also presents complete documentation—including specs, design, and code—for 4 business programs...documentation that can save a programmer many hours of effort when developing a new program.

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Federal Express Puts Dollars — \$24 Million —

By Katherine Hafner
CW Staff

MEMPHIS, Tenn. — When Federal Express Corp. wanted to prove to the American public that the quickest route between any two points in the U.S. is through Memphis, corporate officials demanded an unerring communications network.

And they were willing to put dollars behind their demand. Today they spend \$24 million annually on overall communications; about 20% of that sum is devoted to data com-

communications.

The 10-year-old company, which in its 1983 fiscal year topped \$1 billion in revenues for the first time, turned the problem of transporting a package overnight from point A to point B into a creative challenge. Federal Express is the originator of the "hub and spoke" concept of overnight delivery, a concept that at first glance seemed so improbable even the company's original investors balked.

Each one of the 200,000 packages to be delivered the next day, no matter its origin or destination, is flown to the "superhub" at the Memphis International Airport. While the city sleeps, 1,300 employees sort the packages in the space of two hours.

By 2 a.m., each package is on a Federal Express jet chasing a 10:30 a.m. delivery deadline.

Dan Hinsley, Federal Express' director of communications and operations support, said the company is one of IBM's largest customers. Two of the company's four IBM mainframes in Memphis (two additional mainframes reside in Colorado Springs, Colo., for backup and software development) are devoted to nothing but on-line data communications.

Operating under IBM's Systems Network Architecture/Synchronous Data Link Control, the two IBM 3081 machines, each with 24M bytes of internal memory, handle two specific communications networks: the Fed-

eral Express Customers; Operations Service; Master On-Line System (Cosmos) network, which is dedicated to customer inquiries and customer support; and the data communications network for internal information such as flight schedules and weather reports.

Approximately 6,000 IBM 3270 terminals throughout the country transmit data through modems at speeds from 4,800 bit/sec to 9,600 bit/sec over 281 circuits, 250 of which are dedicated leased lines. In all, over 150,000 circuit miles of telephone transmission are traversed by the Federal Express network.

The company uses 10 IBM 3705 front-end processors and one NCR Corp. Comten 3650 front-end proces-

Federal Express Going Mobile

MEMPHIS, Tenn. — The fact that Federal Express Corp. commands 48% of the air freight market might be explained in part by its commitment to exploring new technological territory. One such novelty is the company's Digitally Aided Dispatch System (Dads), a plan in progress to equip 3,000 of the company's 4,500 courier vans with \$2,500 mobile terminals by the end of 1984.

Federal Express van drivers have until now communicated with local dispatch stations via voice-only, two-way radio. When the voice traffic over the radio became so heavy that getting information out to drivers became increasingly difficult, the company devised Dads.

Now when a customer dials a local Federal Express number, the call is automatically switched over leased lines to one of three call centers in Memphis, Tenn., Somerset, N.J., and Sacramento, Calif. An automatic call distributor directs the call to a service agent.

The service agent decides how the order should be routed. The Memphis IBM 3081 mainframe then provides the agent with a confirmation number for the customer while it simultaneously transmits the order to the Chicago dispatch center.

A Chicago dispatcher reviews the order, then sends it to the appropriate courier in the field. It is received by a Mobile Data International terminal which is attached to a Motorola, Inc. digital radio operating at 800 MHz. When a driver signs on to his or her terminal in the afternoon, the orders for the afternoon are displayed on the screen and the driver can plan a local route.



Dads In Federal Express Van

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Landier's system architecture is structured in layers with defined interfaces between layers. This is similar to modern network architecture, in particular SNA. Logical addressing provides connections to the physical links for all the devices and processes in the system. This even applies to the smallest system. Thus, modifications or extensions to the configuration may be made without affecting the end user.¹⁰

"Can Lanier's distributed architecture keep up with my company's changing needs?"

Certainly, Lanier's layered architecture makes it easy to upgrade the processor, the controller hardware, and the file system. All such improvements are transparent to the user.

community, except for increased performance and functions. The advantage of the architecture is that systems are easy to modify as new requirements evolve."

"But haven't these types of architectures been around for years?"

Yes, many of today's most effective system designs use them. However, an important difference in our philosophy is our adherence to an open system interconnection concept. Although primary emphasis is on SNA, future plans include other de facto standards as they evolve."

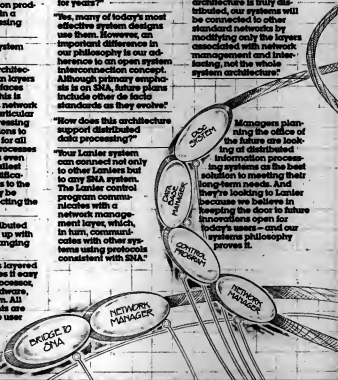
"How does this architecture support distributed data processing?"

Four Lanier system can connect not only to other Laniers but to any SNA system. The Lanier control program communicates with a network management layer, which, in turn, communicates with other systems using protocols consistent with SNA.

"But what about communicating with systems that don't use SNA?"

"Lanier will interface to other networks and support various communications protocols as they become major industry standards. Because our architecture is truly distributed, our systems will be connected to other standard networks by modifying only the layers associated with network management and interfacing, not the whole system architecture."

Managers planning the office of the future are looking at distributed information processing systems as the best solution to meeting their long-term needs. And we're looking to Lanier because we believe in opening the door to future innovations open for today's users - and our systems philosophy proves it.



International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

BRAZIL

SAO PAULO — Ricardo Maciel, the subsecretary of strategic activities at Brazil's Special Department of Informatics (SEI), called on Brazil's computer industry to come up with alternatives to imported telecommunications technology. Maciel made his appeal for standardization of protocols and increased compatibility of Brazil's national minicomputers with mainframe technology at the recent Computer Network Conference.

SAO PAULO — Despite the protectionist climate prevailing within the Brazilian computer industry, Ap-

ple Computer, Inc. is making plans to do business here. Apple's Latin American sales manager, Hector Saldana, said that Brazil offers great potential for Apple's microcomputer business in Latin America.

CHINA

BEIJING — The Ministry of the Electronics Industry will sponsor an exhibition here Sept. 1-25 to display Chinese achievements in electronics since 1978. More than 800 exhibitors are expected to showcase some 3,000 products, including large-scale computers, minicomputers and microcomputers, with special emphasis on Chinese character processing and

computer applications.

DENMARK

COPENHAGEN — Christian Røvsing, Denmark's largest data processing firm, reported that it has increased its profits 37% over last year, largely due to big contracts with Canadian and American airline companies.

COPENHAGEN — Denmark's Risoe Energy Research Center has established a data base here that services some 11 windmill manufacturers. Approximately 300 end users will access a Burroughs Corp. B7800 mainframe at the center

to exchange information and research to help improve their respective windmill product lines.

COPENHAGEN — Dansk Data Electronics Co. has begun exporting its 32-bit Unimax system to Taiwan under the terms of a \$1.5 million contract.

JAPAN

TOKYO — In the first 10 days of customer shipments, IBM Japan has delivered over 1,800 units of the 5550, the Japanese version of the IBM Personal Computer. Production is slated to double in August, sources said.

TOKYO — Nippon Data General has unveiled four small computer systems, about two weeks after a similar announcement was made at Data General Corp. in the U.S. Two of the four new systems are said to support Japanese language processing. Deliveries are scheduled to begin in December.

TOKYO — Yokogawa Hewlett-Packard (YHP) has introduced its first Japanese workstation to operate with the HP 300 minicomputer. The 16-bit personal computer, however, is not being offered by YHP as a stand-alone personal computer. Instead, it is being sold by Canon. Inc. under the name of Canon AS-100.

WEST GERMANY

MUNICH — Peripheral Computer Systems GmbH has begun shipments of its System Cadmus-QU6800 to the U.S. The system, which runs under the Unix operating system, is being sold in the U.S. by the newly formed Cadmus Computer Systems, Inc.

India Gives Kapur Award

DANVILLE, Calif. — A systems consultant based here has received his native country's Distinguished Achievement Award for his contributions to DP management and education.

The award to Kapur & Associates, Inc. head Gopal Kapur was presented by the president of India, Giani Zail Singh, during a ceremony at Singh's official residence in New Delhi, India. Accepting the award in Kapur's absence were his parents, Prof. and Mrs. B.K. Kapur.

In addition to running his own management consulting firm, Kapur chairs the Information Systems Advisory Board at Golden Gate University in nearby San Francisco.

Kapur, a native of the Punjab region of northern India, has written many articles dealing with DP subjects, as well as two books: *IBM 360 Assembler Language Programming and Programming in Standard Cobol*. He graduated summa cum laude from India's Thapar Institute of Engineering and Technology and is listed in both "Who's Who in the West" and "Who's Who in DP."

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CD CONTROL DATA

Seagate's Corporate Scientist Unmasked

By Katherine Hafner

SCOTTS VALLEY, Calif. — When Seagate Technology, Inc. advertised for a corporate scientist, Dr. Sidney Friedman was quick to apply.

Touting himself as a research scientist of world renown, the 48-year-old Friedman told Seagate in a smooth British accent that he had been science adviser to every president since Kennedy, that he held more than 300 high-tech patents and that he had served as consultant to the likes of IBM, Motorola, Inc., Xerox Corp. and Memorex Corp. to name a few.

Of particular interest to Seagate, a large manufacturer of 5¼-in. Winchester disk drives here, was Friedman's work, his resume said, in "8-in. Winchester disk drives, 14-in. Winchester ... and disk drive analyzers."

Seagate hired Friedman June 10 for a \$95,000 annual salary as a research scientist. But when Friedman bounced a \$34,000 check to join the firm's stock option plan, along with a \$5,000 check to his tailor in the UK, Seagate grew suspicious and took a closer look at his credentials.

The celebrated scientist with a Ph.D. from Oxford University, it turned out, was a former convict who had once posed as a San Diego physician and was on probation in Los Angeles for a similar misrepresentation.

Having lasted exactly 10 days at Seagate before he was unmasked, Friedman was arraigned last Wednesday on charges of grand theft and writing bad checks. He is being held at the Santa Cruz County Jail.

Fast Talker

Friedman slipped past Seagate's customary screening procedure by talking his way into the position, said Madeleine Boriss, Santa Cruz County's deputy district attorney. "He does have a degree in chemistry from some school in Baltimore, so maybe he does know enough rudimentary things to talk his way into a job like that," Boriss said. "At least he seemed to know all the jargon."

Apparently Friedman also received a recommendation from an executive headhunter in Southern California whom officials have tried to trace. "When Seagate advertised for the position, someone named Maurice Spitz called and said, 'Have I got a guy for you,' Seagate said 'Phooey, we don't talk to people who call themselves executive headhunters,' but Friedman came in through the transom and talked his way into the job," Boriss said.

Once Friedman had been hired, Boriss said, he was flanked at one point by a bodyguard named Mo Spitz, who reportedly watched Friedman's seven Yorkshire terriers as well. Neither Spitz nor the terriers are anywhere to be found.

"Maybe Mo Spitz disappeared into the sunset with Friedman's terriers," Boriss surmised.

Why would Friedman allow his checks to bounce if he did not want to arouse suspicion?

"Stupidity. That's why he got caught," Boriss said. "He's good enough to get in the door. He's just not good enough to stay there."

'Speaks Eskimo, Holds 300 Patents ...'

SANTA CRUZ, Calif. — When Dr. Sidney Friedman applied for the job of corporate scientist at Seagate Technology, Inc., his resume listed the following accomplishments, according to Madeleine Boriss, Santa Cruz County's deputy district attorney:

- Holder of more than 300 patents issued worldwide.
- Science adviser to presidents of the U.S., government of Great Britain, government of West Germany, Free China.
- Consultant to over 150 of the largest corporations worldwide.

• Speaks, writes and reads 13 languages, including Eskimo, Swahili and Hungarian.

• Received two Ph.D. degrees cum laude, one in physics and one in electrical engineering. Both degrees came from "Oxford University in Cambridge."

• Had previously been vice-president of technical consulting for West Coast Research Associates in Munich, and vice-president of S. Friedman and Associates in Washington, D.C.

• Held patents or published papers on the 6800, 6805, 6806,

Z80, Z8000 and MDC 68000 micro-processors. According to his resume, he also worked on "diagnostic monolithic devices, FET devices, ZH51C devices, microprocessor-based systems," as well as 8-in. Winchester Disk Drives and 14-in. Winchester.

• Consulted for IBM, Motorola, Inc., Texas Instruments, Inc., TRW, Litton Industries, Inc., Xerox Corp., Intel Corp., Fairchild Camera and Instrument Corp., General Electric Co., Zenith Data Systems Corp., U.S. Department of Defense, RCA Corp.

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Job Experts: Tougher for Programmers to Rise

By Tom Henkel
CW Staff

The top job in a DP shop is no longer reserved for people of job titles like systems programmer or programmer/analyst.

A lack of financial and management experience, coupled with increased competition for management information systems (MIS) management jobs from other parts of the company, is making it harder for employees with those job titles to make big leaps up the corporate ladder, according to several experts in the DP job market.

Michael Lawson, head of a new master of science/MIS program at Boston University, noted that while executive positions have always been hard to come by, DPs can no longer assume they have a clear path to a vice-presidential position based solely on their technical expertise. The ideal candidate for a top DP slot must also have the financial savvy to understand and evaluate acquisition deals.

But most importantly, Lawson said, corporations today want a seasoned manager to head DP operations, and they will often waive technical experience for a proven leader with strong interpersonal skills and the ability to make financial decisions.

The objective of Boston University's MIS program, Lawson said, is to train people from both financial and technical disciplines to be DP executives.

DDS, TDS Rates To Be Reduced

WASHINGTON, D.C. — Reduced rates for subscribers to AT&T's Data-telephone Digital Service (DDS) and Terrestrial Digital Service (TDS) are contained in an amended tariff scheduled to become effective Aug. 24. The reductions apply to subscribers that supply their own terminal interfaces, known officially as channel service units.

The amended tariff results from a recent Federal Communications Commission decision (Docket 81-216) requiring AT&T to unbundle the terminal interface charge from the circuit charge (CW, June 20).

For DDS customers without a channel service unit, the new digital station terminal rate will range from \$65.05/mo for 2,400 bit/sec service to \$673.40/mo for 56K bit/sec service. This compares with the present rates of \$99.65 to \$908 for a digital station terminal that includes a channel service unit. The digital station terminal installation charge of \$148 will remain unchanged.

If a DDS subscriber wants an AT&T-supplied channel service unit, the tariff specifies an additional one-time installation charge of \$100 plus \$34.60/mo.

Under the amended tariff, the charge for a TDS channel will be \$330/mo. Currently it costs \$450 for a channel plus a channel service unit. The TDS installation charge of \$361 also remains unchanged.

An AT&T-supplied channel service unit for TDS will cost \$170/mo plus \$144 for installation.

tives. But some professional recruiters believe that while more education is usually helpful in career advancement, going back to school to learn how to be a DP executive could have its drawbacks. They point out that DPs attending classes to improve managerial and financial skills could wind up losing some of their technical edge.

Moreover, when the going gets tough, the nontechnical DP executive sometimes gets the boot, according to Richard Kolikof, a research associate with Boston-based Gray Systems Group. In financially difficult times, that executive can be viewed as more of a luxury than a necessity, Kolikof explained.

Time is the biggest advantage on

the side of technical members of the DP staff who have high career aspirations, Kolikof maintained. Many companies will not allow their DP operations to function without a leader, and if the top DP executive leaves the company, the job is usually filled quickly.

In addition, many companies prefer not to advertise for DP executives. An ad in the help wanted section of the Sunday paper is perceived as an admission of uncertainty within the company. Therefore, many companies prefer to fill DP executive jobs either from within (often an advantage for the technical person) or with the help of professional recruitment firms.

Both Kolikof and Sanford Rose,

head of the Sanford Rose Associates recruitment firm in Akron, Ohio, cautioned that the DP executive's job is not for everyone. Some DPs who finally make it to the corner office find themselves quite unhappy — bogged down in a mire of financial and managerial tasks.

And sometimes moving into the head DP slot can be a bad career move, Rose observed. For example, if a company is operating with outdated hardware, becoming the executive in charge of that operation could prove to be a long-term limitation. In some cases, DPs would be better off switching to a more progressive company but keeping their same systems programmer or systems analyst job classification, Rose said.

DATA GENERAL INTRODUCES THE DESKTOP GENERATION.



Graphics, Program Generators Key Panel Forecasts the Future of Programming

By Paul Gillin

CW Staff

WASHINGTON, D.C. — Graphics and automatic program generators may become a standard part of the programmer's repertoire in the future. And the programming environment will focus less on individual effort and more on teamwork, with a greater reliance on advanced management and human factors techniques.

That was the broad consensus of opinion among panelists who assembled at the Software conference here recently for a session on "The Impact of Future Technology on Programming." The three-day conference

was held by the Institute of Electrical and Electronics Engineers, the National Bureau of Standards and the Association for Computing Machinery's Special Interest Group on Software.

Addressing the role of standard programming languages in future technology, Richard Wexelblatt, director of design methods research in the Systems Research Division of the Advanced Technology Center at ITT, endorsed the continued use of Cobol. "I wish Ada would go away," he asserted. "If we have to have a big wacky language, why not make it one we know."

But, Wexelblatt added, "The future

will not be through programming but through automatic generation. Every programming stage we have today could be automated."

The shift in programming power toward the end user and the microcomputer is "in effect, moving back to the 1950s" but with a much greater range of tools, said Harold Feinleib, president of Non-Procedural Systems of Westport, Conn. "High-powered personal workstations give designers a chance to use CPU resources where otherwise they go to waste," he said.

The next five years will also see a dramatic expansion in tools for end-user computing, Feinleib said. These

tools will be "primarily data base-oriented and allow users to deal in an environment they're familiar with," he said. But tools aren't everything, he noted. "To unleash the creativity within us will require understanding human factors, psychology, management and organizational techniques."

Those same factors were cited by Robert Stults of Xerox Corp.'s Palo Alto, Calif., research center. "I am interested in the support of design as a social process rather than an individual endeavor," he maintained. "We should start taking hardware for granted and start shaping the programming environment around social factors."

Programmer productivity tools have been used too little in recent years, but will gain in popularity in the future, according to Jack Ring, director of special projects at Honeywell Information Systems, Inc. in Phoenix. "I'm sorry that software management did not have the courage and smarts to invest [in these tools]," Ring said. "This is going to change."

Ring joked that programming resources are now devoted "10% to productive work, 40% to discovering things like what the user really wanted and the way the operating system works and 50% to waste like debugging."

Future improvements will include what he called a rational design methodology; quality assurance, which concentrates on catching program errors before they occur; very high-level languages; portability of software; and the so-called "programmer workbench" concept of software manufacturing.

Software Graphics in Lead?

Noting that few members of the audience had probably considered the idea before, Craig Field, of the office of cybernetics technology at the Defense Advanced Research Projects Agency, proposed that software graphics could lead future programming technologies.

Software graphics is "a means of getting programs out of text editing," Field said. "You program by manipulating icons on the screen. Then when a success in software graphics could lead future programming technologies."

Field pointed to Apple Computer, Inc.'s Lisa and Xerox's Smalltalk as examples of user-friendly technologies that can be applied to programming. "It's farther along than you may think," he said. "One company is expected soon to announce a ghost version of this which has taken mediocre programmers and made their work comparable to the best programmers."

A panel member who had worked on both Smalltalk and Lisa concurred. "One problem has been keeping the user interface consistent," said Larry Tesler of Apple. "We're moving to an object-oriented methodology. Most users [of the future] will expect to move from one machine to another easily. Applications will have to hide what is really going on."

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Congress Urged to Address Federal DP Security

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A congressional mandate for a coherent, governmentwide computer security effort may be needed to correct the current lack of adequate security arrangements in many federal programs, a recent study by a Capitol Hill research group has concluded.

"Protecting computer and information resources continues to receive attention, but in some instances very little action," the study from the Library of Congress Congressional Research Service (CRS) said. It continued by stating that "The reluctance to support computer security initiatives and the lack of strong computer security programs in some

federal agencies indicates a need for more direction from policymakers."

The study, prepared by CRS information science and technology specialist Louise G. Becker, comes on the heels of a federal agency report showing that the government does not have complete information or the means to gather it on the full extent of computer crime and abuse in agency programs.

The CRS study similarly reported that although "certain federal agencies are making some progress to protect systems against inherent vulnerabilities and computer abuses... there is a need for additional guidance and standards."

"Over the years," the study said, "Congress has generally approached

computer security issues from the single perspective associated with a specific set of problems. The omnibus approach to computer security has rarely been taken, partially due to the myriad of problems encountered and the fragmented responsibilities."

The 250-page CRS study, described as "a cursory introduction to this multifaceted subject," examined computer security from the perspective of national security and defense, federal information resources management, privacy and confidentiality and computer crime and abuse.

In general, the study said, "fragmented federal responsibilities, lack of awareness of the scope of computer abuse, lack of specific guidance,

discrepancies in policies, misinterpretations of requirements and lack of prioritization have left the federal agencies with a 'patch quilt' and 'band-Aid' approach to providing for the security of federal information resources."

At present, the report said, some federal DP security experts tend to view the problems "from a narrow technical orientation." The report suggested a need to balance technical perspectives with "administrative and oversight measures." CRS offered for congressional consideration 20 possible actions, including:

- Creating a congressional advisory group to help develop security policy options and conduct "a more objective review" of DP/telecommunications technology planning in federal agency programs.

- Creating a comprehensive office with "special investigatory capability to review nondefense agencies' computer security plans and operational procedures."

- Strengthening penalties for federal computer system misuse and abuse and instituting "clearer, consistent and more stringent administrative sanctions" for improper or illegal use of federal information technology resources.

- Establishing a clearinghouse to identify vulnerabilities and threats to federal systems.

Chip Design Bill Receives Support

WASHINGTON, D.C. — Legislation to extend copyright protection to computer chip designs picked up steam last week as congressional representatives from Silicon Valley and a semiconductor industry spokesman told a U.S. House of Representatives subcommittee that the bill is critical to American electronics.

"Passage of this legislation is vitally important to the continued strength and viability of our electronics industry," Rep. Norman Y. Mineta (D-Calif.) told the Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice last Wednesday. Urging House support of the bill, Mineta said, "Our laws must be adapted to fit the realities of our times."

Rep. Don Edwards (D-Calif.), a sponsor of the Computer Chip Protection Act, said the bill "is a good law. There is an urgent need for its enactment."

The bill, which is also under consideration in the Senate [CW, June 6], would amend copyright law to include 10-year coverage for semiconductor designs, while permitting reverse engineering and mandating compulsory licenses for those who innocently infringe on chip copyrights.

F. Thomas Dunlap Jr., Intel Corp. corporate counsel and secretary, appeared before the subcommittee representing the Semiconductor Industry Association. After four years of debate, he said, the Semiconductor Industry Association has decided that chip copyrights are "the only practical method of protecting our valuable patterns."

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German DPer Charged With Stealing Tapes

By Patricia Keefe
CW Staff

ATLANTA — A West German systems analyst was arrested at Hartsfield Airport here last month after agents of the U.S. Customs Service and the Federal Bureau of Investigation searched his luggage and found two 16-in. computer tape reels containing information reportedly valued at \$420,000.

The tapes belonged to the U.S. subsidiary of SPO Lethoff GmbH, the West German employer of Josef Reiter, who was charged with interstate transportation of stolen property. SPO Lethoff compiles and creates programs for the business industry in West Germany and, until recently, the U.S.

The U.S. subsidiary, SPO Lethoff, Ltd., based in Raleigh, N.C., ceased

operations shortly after Reiter's arrest.

Reiter's attorney denied the charges, contending that Reiter was the victim of a squabble between the German company and its subsidiary. The 32-year-old Reiter, who had just completed a six-month stint as a contract employee with the subsidiary, was on his way home to Munich with his wife and 22-month-old baby when he was arrested. His family was allowed to continue on to West Germany, but Reiter was taken into custody, according to the lawyer, Andrew Economou.

After spending 11 days in jail on \$25,000 bond, Reiter was freed on \$10,000 personal recognizance, despite the fact that he is a foreign na-

tional. "This shows to me that the government doesn't think a great deal of their case," Economou said.

The government has until Aug. 11 to indict Reiter or drop the charges, which include larceny under the North Carolina statute.

Although the president of the U.S. subsidiary, Hans Hellmig, had originally filed the charges, alerting police that Reiter was on his way out of the country, Economou claims his client did not steal the tapes. The attorney also disputes the value placed on the tapes — \$420,000 — which are said to contain programs for Spartan Foods, a South Carolina chain of restaurants.

Rather than stealing the tapes, Reiter maintains that he was re-

sponding to a directive given to him by officials from the parent company to bring back certain tapes to Germany. "He responded as any employee should to the directive of his boss," Economou said. "What happened between the two bosses [from the parent company and subsidiary], I don't know, but Reiter got caught in the middle."

As for the tapes themselves, Economou said as far as he knew, they were work tapes — useless unless joined with other tapes. "They are certainly of no value to anyone in Germany," he said.

Efforts to reach Hellmig were unsuccessful. Neither the FBI nor the U.S. attorney handling the case would comment.

French, Saudis To Host Meets

WASHINGTON, D.C. — The World Computer Graphics Association, Inc. (WCGA), in separate joint announcements made recently with computer graphics associations in France and Saudi Arabia, revealed plans for conferences in those two countries next year.

Arabian Productivity Advancement Using Computers/Graphics (Apac '84) will be cosponsored in Riyadh, Saudi Arabia, Feb. 20-23 by WCGA and the Middle East Computer Graphics Association (Mega), in association with Snae Establishments of Saudi Arabia. The first in a series of conferences focusing on the Arabian search for high productivity, according to WCGA President Caly C. Smith, Apac '84 will be followed by Apac '85 in Amman, Jordan, and Apac '86 in Beirut, Lebanon.

Micad '84 will be held in Paris Feb. 27 to March 2 in association with Micado, the French computer graphics association which is celebrating its 10th anniversary. Accommodations for more than 100 exhibits will mark the first time that an exhibition has been associated with the Micad biennial conference, said Smith and Pierre Jugu, president of Bureau International de Relations Publiques, who jointly made the announcement.

Further information on the two conferences will be available later this month, according to the WCGA, which is located at Suite 399, 2033 M St. N.W., Washington, D.C. 20036.



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AT FAA Technical Research Center

Seven Dismissed for Alleged System Misuse

By Peter Bartollik

CW Staff

ATLANTIC CITY, N.J. — Seven employees were dismissed from their Federal Aviation Administration (FAA) jobs at a technical research center here in June and July for allegedly misusing government computers to duplicate non-government programs. It was recently learned.

In a statement issued April 30, the Federal Bureau of Investigation confirmed it was investigating allegations that employees at the FAA Technical Center were running a commercial enterprise using government equipment. However, scant in-

formation made available since then points more to a scheme of duplicating video games or home computer programs on a non-profit basis.

The technical center is a research and development facility for the FAA's aviation safety systems, employing about 1,200 people and sprawling over 5,000 acres in Atlantic City and three adjacent townships.

FAA and FBI officials have released little information since the April statement, issued after FBI agents and special agents of the Inspector General's Office in the U.S. Department of Transportation searched an area of the FAA Techni-

cal Center and seized "numerous software and hardware equipment items."

Mark Baylen, legal counsel for the FAA Technical Center, told *Computerworld* recently that government officials "have removed seven individuals for misuse of government property."

The FBI confirmed in April that it had been investigating charges of computer misuse for six months and that it conducted a court-authorized search at the facility on April 30. "It was alleged that [government] computer systems were being used to duplicate and develop computer software programs and hardware

products for use by outside commercial and/or industrial firms," according to a prepared statement issued then by James Cagnassola Jr., special agent in charge of the FBI's Newark division.

FBI officials contacted since the dismissals began in late June have declined to comment beyond the statement issued in April, claiming that standard policy prohibits any comments during "ongoing" investigations.

Donald Connolly, a research psychologist at the center and vice-president of Local 1340 of the National Federation of Federal Employees, told *Computerworld* that five of the dismissed employees are members of his bargaining unit, which has filed for arbitration on their behalf. Regarding the initial FBI statement, Connolly said, "There is no accounting for how things are interpreted... We take the view the charges are not much different than bringing in your own paper and using the [copy machine]."

The statement released in late April by the FBI said the probe was initiated in the latter part of 1982 when senior FAA officials in Washington, D.C., notified the FBI and Inspector General's Office of the suspected misuse. After the search was conducted in "a remote building in the center's R&D area," an FBI agent told reporters it was believed FAA employees were "running a computer business with the equipment."

Shortly after the April raid, an Atlantic City newspaper reported that employees and others familiar with the operations at the center indicated that video game programs would be brought into work and copied on government equipment.

Maria Marks, public affairs officer for the center, said that the facility is involved in testing and evaluation, but declined to identify the equipment involved in the investigation. Other FAA officials have been quoted as saying that the alleged employee scheme did not involve systems used for the center's primary purpose of testing and evaluating aviation safety systems and equipment.

Civil, Criminal Aspects

Marks said little information could be revealed because the investigation is still ongoing, as well as judicial actions that are being pursued. Baylen, the center's legal counsel, said that the probe has both civil and criminal aspects, but that the FAA was not involved directly in the criminal aspect. "We have removed [the employees], and that's about as drastic as [the FAA] can get," Baylen said.

Baylen did confirm that part of the investigation focused on the duplication of computerized home video games, but said he did not know if the scheme was motivated by profit. FAA and FBI officials said they were not aware of any criminal charges filed to date.

Union Vice-President Connolly said the dismissed employees were never charged by the FAA with running a commercial enterprise.



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 **SPERRY**

Students Sue DP School for Misrepresentation

By Patricia Keeffe

CV Staff

DULUTH, Minn. — Three unemployed computer programmers, former students of the Minnesota School of Business here, are suing their alma mater for at least \$50,000 per class member in punitive damages, alleging that the school misled programming students about job opportunities.

In addition, the three charge the school misrepresented its job placement record and the level of education needed to enter successfully into the job market. The school is also accused of exaggerating the types of positions and salaries available to graduates.

Further, the suit maintains that the alleged misrepresentations were malicious and made with the knowledge that a potential student would consider them when deciding whether to take the computer programming course.

The plaintiffs claim the school gave them statistics showing that 99% of its computer programming graduates during 1980 who requested placement assistance found employment in their field. However, after complaints by students and graduates to the state Department of Education, updated statistics were provided that showed a placement record of 30.7% for 1981, the suit stated.



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Filed June 20 in Hennepin County District Court in St. Paul, the suit asks that it be a class action representing all 1981 and 1982 computer programming graduates of the school. Also requested is an order requiring the school to stop making some of the misrepresentations that the suit alleges.

The bid for a class-action suit is being contested by the 100-year-old school, which

was purchased in the late 1960s by ITT Educational Services, Inc., said to be one of the largest vocational educational chains in the U.S. A hearing on that motion is slated for Aug. 22, according to Sherry Chenoweth, the attorney for the plaintiffs and former director of Consumer Affairs in Minnesota for seven years.

Besides punitive damages, the suit also seeks compensa-

tory damages, which Chenoweth estimated could go into "double digits, as high as \$20,000 per student."

The plaintiffs — Gary Coates, Rodney Fure and Stan Fisher — graduated from the Minnesota School of Business' nine-month, \$4,600 course within the past two years and have not been able to find jobs as computer programmers, Chenoweth said. She estimated there will be

"at least 30" plaintiffs joining the suit shortly.

Besides charging that the school misrepresented the job opportunities available to its graduates, the suit is contesting the quality of the education received at the school "and whether the graduates are marketable as a result," said Chenoweth.

A spokesman for ITT Educational Services declined to comment on the suit.

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'Based on Mountains of Statistics' Firm Using Micros to Calculate Value of Lives

By Katherine Hafner
CW Staff

PALO ALTO, Calif. — Legal Economic Evaluations, Inc. (LEEI) prefers to avoid the seamy side of personal injury and wrongful death settlements. Instead of trying to stir a jury to sympathy by showing pictures of dead and maimed persons in a courtroom, the small compa-

ny of three full-time and two part-time employees calculates by computer the strict financial worth of a person's life.

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abled or deceased person.

Suppose, for instance, you are a 40-year-old computer center director in the Midwest making \$22,000 per year. You recently married and plan to have two children, but you die in a car accident involving a rental car with dubious brakes. In the lawsuit against the car rental company, your wife's attor-

ney might call LEEI, whose economists will ignore the emotional side of the issue and concentrate on the financial brass tacks. Including about \$5,000 per year lost in "household services," LEEI figures your worth at \$551,953.

Or if you are a heavy-equipment operator crippled in an accident and are forced

to take a job that pays less, LEEI will calculate your net loss as a result of the injury.

LEEI was founded in February 1982 by Brent Danning and Robert Johnson, two economists who met while working at a San Francisco economic consulting firm where such calculations were done manually. The lengthy and expensive procedure gave Danning and Johnson the idea of setting up a company that automated the process at a fraction of the price.

'Classic Cottage Industry'

"The market right now is your classic cottage industry," Danning commented. "People doing it are usually college professors who do it on the side. They take three weeks to do a one-page report and charge between \$500 and \$3,000."

"We charge \$150 for a nine- to 15-page bound report with color graphics and full documentation," Danning said. "And we can put a number on a case within a day — or an hour if we're pressed for time."

Danning spent three years developing the company's software, which he calls "entirely proprietary."

"We guard it with our lives. It's the only software that's anywhere near its level right now," he asserted.

The microcomputers' calculations are based on mountains of statistics compiled from the Bureau of Labor Statistics, the U.S. Commerce Department, the U.S. Center for Life Statistics and dozens of academic studies.

For a lower fee, the company also works on structured settlement plans and pension valuations.

The estimated 4,000 cases LEEI handles annually are taxing the limit of the Apple's internal memory, a situation Danning addresses by "making the software more efficient" rather than buying new hardware. "This is not exactly a \$100-million-per-year business," he said. "But given the fact we're in a small pond, we're the biggest fish. We do more cases in a month than any other company I'm aware of could do in a year."

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"Would One Of You Men Mind Saving My Wife?"

Laboratory's Net Links Mainframes, Minis

By Robert Batt

CW West Coast Bureau
BERKELEY, Calif. — Linking mainframes and minicomputers from different vendors is a continuing problem in large organizations. However, it can be particularly difficult when coupled with the needs of scientists who transfer and access a variety of extremely vital and experimental data. In an attempt to resolve

the situation, the Lawrence Laboratory here brought in Hyperchannel, a baseband bus networking product manufactured by Network Systems Corp. of Minneapolis and designed to tie together mainframe computers.

The laboratory uses Hyperchannel and its 50M bit/sec transmission speed to link mainframes manufactured by Control Data Corp.

and IBM with one another and with Digital Equipment Corp. minicomputers.

"We needed a device that would allow us to link the files of one machine with another so that we could provide a network for our users with mass storage, printing and electronic mail among our services, while at the same time allowing the central computer facility to maintain overall control,"

explained Howard White, deputy head of the computation department at the laboratory.

The Lawrence Laboratory is owned by the U.S. Department of Defense and run by the University of California on behalf of the Department of Energy. Its research specialties are in fields of energy science such as high-energy physics, nuclear science, seismology and materials

and chemicals, and it uses its computer center for a wide spectrum of applications including data analysis, data reduction, modeling, of chemical structures and information concerning the use of sources.

Wide User Community

The data processing professionals at the lab have a wide user community to look after — approximately 3,000 people, mostly scientists and engineers — and 1,000 terminals.

Hyperchannel is used to link three DEC VAX-11/780s to the laboratory's CDC 6600 and 6400 mainframes. The CDC machines in turn are linked to the lab's main number-crunching machine, a CDC 7600, via a channel-to-channel communications coupler.

Hyperchannel also allows the energy researchers to link their IBM 4341 mainframe to the central 7600 processor as well as to other 4341s in other departments of the university.

"This allows researchers access to our central computing facility and to exchange information with one another. For example, preparatory work may be done on the IBM or DEC equipment and then transferred to the CDC machines," White claimed.

According to White, when the laboratory began looking for a mainframe-to-mainframe link, Hyperchannel was the only suitable product on the market.

Since that time, White added, while other competitive products such as CDC's loosely coupled network and local-area network devices such as Xerox Corp.'s Ethernet have come on the market, there has been no reason to change from using Hyperchannel.

Reliable Product

"It's a reliable product, we are getting good service from the vendor and it is serving our needs effectively at this time," he added.

This is not to say that Hyperchannel has performed flawlessly, White noted. "As with many systems, there is some vulnerability in using the product. On occasions we have had systems that have crashed when there was a problem with Hyperchannel, but that is the price you pay for having a tightly knit network," he asserted.

The linking of heterogeneous equipment in a single network causes complex management problems, White continued, and so the laboratory has devised a series of maintenance strategies and self-diagnostic procedures.

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The highly sophisticated 5620 asynchronous terminal is indicative of what you'll be working with in the future, as well as what you can expect from Teletype Corporation. It's a low-cost, dot-mapped, UNIX*-based terminal that offers a good value in switched or point-to-point private line environments.

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While the 5620 is a programmer's dream, it's also a valuable business tool. It can be used to compare and contrast multiple business situations or cases simultaneously; to develop one case while one or more are being executed; or to examine two sets of files from more than one data base side by side.

You'll enjoy extremely high resolution no matter how much you put on the screen. The dot-mapped display boasts 100 dots per inch resolution on a 15 inch diagonal monitor. You can address a dot anywhere on the screen, which gives you full graphics capabilities. Line drawings and tracings can be made with the "Mouse."

Although the 5620 is complex, it's not difficult to operate. You can use the "Mouse" to control terminal functions through a series of user-friendly menus. There's also a full complement of ergonomic features like a low-profile keyboard that's light enough to rest in your lap, a high resolution screen with brightness control, and a special faceplate to reduce glare.

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Bill Introduced in Senate to Study ID Systems in DP Age

By Jake Kirchner

WASHINGTON, D.C. — Recent attempts to automate a number of federal programs, including those in law enforcement and social services, have revealed the inadequacy of the identification systems upon which many large government systems now rely.

Legislation introduced in the Senate late last month would direct the president to develop proposals for secure and efficient federal identification systems. The measure is necessary, according to its sponsor Sen. Robert Dole (R-Kan.), because of the "confusion, conflict and redundancy which now exist in the various federal identification systems."

Better identification systems are critical in the interagency exchange of information and to protect the privacy of those individuals affected by the programs, Dole said. "At the present time, identification systems are rushing headlong into the computer age with very little interface and cooperation," Dole said when he introduced his bill July 29. He added that identification fraud in government programs at all levels amounts to more than \$24 billion annually.

In terms of federal programs, Dole noted several recently established or proposed automated systems in which secure identification is vital, including the National Driver Register, through which the U.S. Transportation Department will help state driver licensing agencies exchange information on bad drivers; the Federal Bureau of Investigation's Missing Children File, which helps local police trace lost children; automated food stamp distribution systems mandated in a 1982 law; and included in pending legislation, a reliable worker identification systems for purposes of immigration control.

Bill Would Direct Library To Study Role of Books

WASHINGTON, D.C. — A Senate committee has cleared for full Senate consideration legislation directing the Library of Congress to study the role of books in the coming computer age.

The legislation, approved by the Senate Committee on Rules and Administration, would direct the library to solicit private funds for its study. "This study would focus on the dramatic new electronic technologies affecting how we create, disseminate and use the knowledge and experience traditionally published in the printed book," according to the committee.

The study would seek the assistance of authors, educators, publishers, librarians, scientists and individuals in computer technology, industry and labor. It would be completed by Dec. 1, 1984.

NBS Reference Guide Out On Handling Tapes, Disks

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has issued a reference guide to the care and handling of computer tapes and disks.

The guide is divided into five ar-

reas, covering recommendations for daily care and handling of computer magnetic media, care and handling during long-term storage, scheduling media maintenance, tape management systems and operating clean rooms, the NBS said.

Also included are a reference list and two appendices, one of which addresses causes of tape deterioration, chemical and physical. The publication recommends ways to recover data after a catastrophe, such as fire or flood.

"Care and Handling of Computer Magnetic Storage Media" (ordered

by stock No. 003-003-02486-4) is available for \$5 from the U.S. Government Printing Office, Washington, D.C. 20402.

CLA Elects New Officers; Keplinger Named President

WASHINGTON, D.C. — The Computer Law Association (CLA) has elected Michael S. Keplinger to a two-year term as association president. Keplinger is director of information services for the U.S. Copyright Office.

Richard M. McConigal of Morgan,

Lewis & Bockius in Miami is the new senior vice-president, and Susan H. Nycum of Gaston Snow & Ely Bartlett, Palo Alto, Calif., is a new vice-president.

Daniel G. Cooper of McCarthy & McCarthy, Toronto, continues as vice-president, and Daniel T. Brooks of Computer Law Advisors, Springfield, Va., continues as secretary/treasurer.

The CLA, with more than 600 members, is open to attorneys only, but nonmembers are permitted to attend association conferences. Its next program, "Transfer of Computer Technology in Canada," will be held in Toronto Oct. 3-4. More information is available from 6101 Lorcum Court, Springfield, Va. 22152.

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Streamlines Federal Bureaucracy

Integrated System Helps Agency Decentralize

WASHINGTON, D.C. — Less than two years after its installation, an integrated word processing and data processing system has enabled the Rural Electrification Administration (REA) — one of the busiest agencies in the federal government — to achieve a long-sought-after decentralization of its operations.

Consequently, the REA has been able to respond quickly to directives from

the White House for the streamlining of the sprawling federal bureaucracy.

The REA was established in 1939 as an emergency relief program. Over the years the agency evolved, but always within the context of its original purpose — to support rural utility service.

REA electric loans are still made to nonprofit and cooperative associations, public bodies and other electric utilities to finance the construc-

tion and operation of distribution lines or systems, generating plants and transmission lines. The REA is part of the U.S. Department of Agriculture.

The computer system puts fiscal controls on some \$48 billion laid out as loans, according to Paul Taylor, director of statistics and data processing at the REA: The system also allows the tracking of more than 2,000 electric and telephone borrowers in 47 states. These utilities serve an estimated 35 million Americans.

Aided by the REA, the utilities have uncoupled some 2.8 million miles of electric and telephone wires across the country. Of the \$7.8 billion loaned and guaranteed through Dec. 31, 1981, less than 1% has been lost through foreclosures or failures.

The maintenance of this record is one of the uses of the Wang Laboratories, Inc.

V5 system used for both word and data processing. "The Wang system is used to collect information on all loan applications that come into the agency," Taylor said.

"The applications are logged into the system the day they arrive," Taylor said. "They stay there until the loan is paid back. At any time we can call up a loan... to determine its current status. We have a readout... telling us the dollar amount of the loan and its specific purpose."

Annual Report Time

When requests for statistics arrive in Taylor's office, his staff turns to the computer system — especially when it is time to prepare the agency's Annual Statistics Report. These documents number some 400 or more pages and consist of two compilations of financial statements from each of the agency's 2,000-plus borrowers.

"The information for these reports would start to come in after the borrowers closed their books on the calendar year," Taylor said. "In the past, we would collect the raw data and then turn it over to an outside contractor for key punching."

Now, the single integrated system is a step toward the eventual decentralization of data processing and word processing at the REA," Taylor said.

"In government, the personnel factor has become an issue," Taylor said.

"If a new requirement comes along, then an agency has to comply using what staff they happen to have on hand," Taylor continued.

"This is a factor no matter how long it takes to get a job done. New hiring is essentially frozen by presidential directive. I see no time during the next few years when this situation is going to reverse itself," he said.

ACM's Sigcomm '84 Set For June in Montreal

NEW YORK — The Association for Computing Machinery (ACM) has scheduled a symposium for next June 8-8 in Montreal on "Communication Architectures and Protocols," and the group has issued a call for papers.

Sponsored by the ACM's

Special Interest Group on Data Communications (Sigcomm), the Sigcomm '84 Symposium will provide a forum for the presentation and discussion of state-of-the-art network architectures, algorithms, performance models and protocols for data communications.

Papers concerned with both theory and practice based on software design for specific applications and/or specific technologies are being solicited, according to ACM.

Papers should be about 20 double-spaced pages and must be submitted by Nov. 1; authors should expect to sign an ACM copyright release form.

Further information can be obtained from General Symposium Chairman Michael J. Ferguson, INRS-Telecommunications, 3 Place du Commerce, Verdun, Quebec H3E 1H6 Canada.



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Can DP Age Barrier Be Overcome?

Q Does age discrimination color DP hiring practices? I maintain a strong yes! How many DP employees have retired from DP departments with a pension? What has happened to those who have been unable to relocate in DP jobs? Have they just faded away?

A My experience has sadly borne out this age discrimination. Since reaching 40, I've been rowing hard upstream in vain to land a new professional-level DP job.

A recent newspaper ad was pretty blatant: "Director of Systems Development, age 27-35." Of course, management must lie about age discrimination or face federal labor charges in court.

Is there a solution?

A Age discrimination is alive and well in the youth-oriented computer/management information system (MIS) community.

Here is where the problem occurs. Some senior programmers and analysts have not kept abreast of the technology. These people are making salaries that are disproportionate to their contributions. There comes a time when management can get twice the productivity for the same amount of money, and it is doing just that.

There is no easy solution. Members of the over-40 group are at a disadvantage whether they are seeking management positions or programmer/analyst positions. Companies with qualified candidates for management positions are promoting from within. Companies recruiting programmer/analysts screen out candidates whose most recent salary (candidate expectations notwithstanding) is beyond the salary ceiling of available positions.

I see two possible solutions to the problem of age discrimination in the computer/MIS fields.

First, we need to create an awareness of the benefits of lateral promotions of MIS people into the functional areas.

Second, we need to create career paths for more senior people so that those who wish to remain in technical positions can do so with pay commensurate with their contributions. This may mean that at some point their salaries are actually reduced.

We must work on the first; the latter is inevitable.

Q Several of my programmer friends and I would like to strike out on our own and do contract work. We're all pretty aggressive. Do you think we can drum up business on our own, or should we go with a contracting service?

A If you have the interest, skill and ability to market your services, why not give it a try? After a few months, you will know if you like this aspect of contract programming and if you're good at it. If you're expending all your time in nonbillable marketing activities, then perhaps you should exchange a percentage of your fees for

contract leads and sign an agreement with a contracting service.

Q My wife and I would like to take advantage of the fact that we're both Cobol programmers and take jobs at the same company. Currently, we each commute about half an hour to work, but in different directions.

A small company within 20 minutes of our home has extended to each of us an offer of equal pay. If we accept the positions, there will be a total of four programmers at the company. We're excited about it and are leaning toward accepting the offers. Do you see any problems with a husband and wife pursuing

programming careers at the same company?

A At this particular company, yes. Whether or not we like it, we are all in competition with one another (unless, of course, you are a card-carrying underachiever).

Direct professional competition with one's spouse for pay and recognition does not create a healthy situation. It's inevitable that one of you will receive a better performance evaluation and salary increase. If you worked at different companies or, perhaps, a larger company in different departments, the difference in salaries could be attributed to varying circumstances.



Have you considered creating a partnership and doing free-lance contract work?

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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Course Addresses Output, Stress of VDT Users

By Marguerite Zientara
CW Staff

NEWTON, Mass. — Would you invest \$5,000 to reduce stress, improve productivity, increase speed and decrease errors for your VDT operators — both clerical and professional?

Many firms that have done so report great improvements in all those areas. One vendor that offers training for VDT operators is the Seattle-based Joyce Institute, whose ergonomic skills training program is called Dataspan.

The Institute initiated the program a year and a half ago and to date has trained nearly 3,000 people, founder Marilyn Joyce said. According to Dataspan's precourse, post-

course and follow-up evaluations, those who complete the course experience an average rate increase of 70%, error reduction of 50% and health/comfort increases of 85%.

Dataspan is a 10-hour course that teaches visual, auditory and physical skills to make VDT workers more comfortable on the job and therefore more productive, explained DeAnne Rosenberg, management consultant and president of DeAnne Rosenberg, Inc., Lexington, Mass., the Boston area's Dataspan agent.

"You can't just tell people to relax, to work faster and to be more accurate," Rosenberg said. "You must give them the skills to do that." The type of training offered to each VDT operator depends on his or her job

tasks — whether they involve word processing, customer service or programming.

In a presentation before 30 managers here last week, Rosenberg demonstrated some of the Dataspan techniques. Besides strengthening visual and auditory short-term memory, the training is designed to reduce eye-strain and fatigue, improve concentration, reduce back and neck strain and reduce the stress and pressure of computer work.

"The National Institute for Occupational Safety and Health [NIOSH] has found that the stress levels of VDT operators are even higher than those of air traffic controllers," Rosenberg noted.

The course is based on "very spe-

cific exercises for eyes, ears and bodies and how to use them at work," Rosenberg said. Eye exercises are designed to remedy the problems of "regression," returning to words already read; "slow recovery," returning to the beginning of the line just read; and "fixation," the time needed to perceive-written material.

The course also aims to improve "chunking," or the number of digits one can remember at a glance. Dataspan also teaches operators to adjust and reorient their eyes from black-on-white print to light-on-dark screens and to deal with the flicker of screens.

The auditory training teaches active listening and how to deal with difficult people or situations on the telephone. "Traditional education teaches nothing about receiving information auditorially and duplicating it physically," Rosenberg said.

The physical exercises taught — recommended to be done 12 to 15 times a day — are meant to ease backache and tightness in the shoulders, neck, arms, wrists and fingers.

Exercise breaks are designed to last from 30 seconds to three minutes each and can be done at the work site. "Short, frequent breaks result in high and constant productivity, while longer, infrequent breaks mean productivity slips as break time approaches," she said.

Dataspan also teaches good posture. "The average human head weighs 10 to 15 lb, and every inch forward doubles the weight of the head," Rosenberg said. "People working at terminals often lean far forward, so there are all these 30- to 40-lb heads out there."

The course is usually given on five consecutive days for two hours each day, but schedules can be varied to suit individual companies. The fee of \$5,000 for up to 30 people in a class covers the trainer, equipment, associated materials, a productivity audit 90 days after the course and job site visits, in which Dataspan representatives counsel workers on ergonomic factors such as lighting, chair adjustments and terminal placement.

For \$10,000, Dataspan will train one person from a firm to teach the course to the rest of the company.

Managers attending last week's Dataspan presentation seemed positive in their reactions to the course. A spokeswoman for State Mutual Life Insurance Co. in Worcester, Mass., said she felt it was important to implement such a program "before we start getting high absenteeism, complaints, even litigation."

Charles Miller, DF manager for 141 Corrugated Box Corp. in Franklin, Mass., planned to recommend the course to his superiors. "It has a lot of merit and at least bears looking into," he said.

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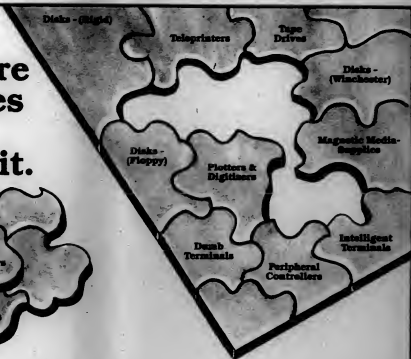
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The *Computerworld Buyer's Guide to Terminals & Peripherals* is the second in our buyer's guide series and provides detailed, all-inclusive listings and in-depth purchase decision information that DP professionals need as this market continues to

grow. Listings are divided into two sections: complete product listings and vendor profiles. Product listings include name and model number, operating system environment, number of installations, delivery and price data, etc. Vendor profiles include company name, address, contact information, primary markets served and more. Tab dividers separate each category and cross references add to ease-of-use.

Buyers will refer to *Computerworld Buyer's Guide to Terminals & Peripherals* again and again for vital purchasing information. And advertisers will find this guide a powerful vehicle for telling their story to *Computerworld* subscribers at that crucial moment when they are actively seeking vendors.

The issue date is October 5. Advertising space close is August 12. Take advantage of our "Early Bird" close offer: 15% discount on all ads and inserts ordered by July 1. Watch for the additional *Computerworld Buyer's Guides* for 1983: *Computer Systems and Software*.

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Calendar

Week of Sept. 4

Sept. 9-12, Boston — **Systems Analysis Workshop**. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Week of Sept. 11

Sept. 12-14, Orlando, Fla. — **American Production and Inventory Control Society (Apics) 1983 Fall Seminar**. Contact: Apics Society Headquarters, 500 W. Annandale Road, Falls Church, Va. 22046.

Sept. 12-14, Washington, D.C. — **Evaluating, Selecting and Using Computer Software Packages**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 12-14, Chicago — **DP for Senior Executives**. Contact: Ed Green, Executive Education Center, Peat, Marwick, Mitchell and Co., 810 Seventh Ave., New York, N.Y. 10019.

Sept. 12-14, San Francisco — **Data Base Management Systems: A Comparative Analysis of General Purpose Systems**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 12-14, Boston — **Data Base Concepts**. Contact: QED Information Sciences, Inc., QED Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Sept. 12-14, Boston — **Data Communications: An Introduction to Concepts and Systems**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 12-15, Fort Lee, N.J. — **Vitam: From Start to Finish**. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 12-15, New York — **Data Base Administration and Control Workshop**. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 12-15, Fort Lee, N.J. — **CICS/VS Logic and Debugging**. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held in New York.

Sept. 12-16, New York — **Hand-**

On Unit System Workshop. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Sept. 12-16, Minneapolis — **CICS/VS Applications Programming, Macro Level**. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 12-16, Englewood Cliffs, N.J. — **Software Engineering and Forecasting**. Contact: The Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyside, Calif. 94086.

Sept. 12-16, New Orleans — **CICS/VS Internals**. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 14, New York — **Files on the Unix System**. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Sept. 14-15, New York — **Voice Processing**. Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

Sept. 14-15, Los Angeles — **Recovery/Restart**. Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

Sept. 14-16, New York — **Structured Analysis and Design**. Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Sept. 14-16, Washington, D.C. — **Computer Operation Management Effective Techniques**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 14-16, Madrid, Spain — **Euro-micro 1983 Symposium**. Contact: Euro-micro, Th. Twente, P.O. Box 217, Department INF, Room A312, 7500 AE Enschede, The Netherlands.

Sept. 14-16, Los Angeles — **SAS Basics Course**. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Sept. 14-16, Washington, D.C. — **Data Communications for Microcomputers**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 14-16, College Park, Md. — **Structured Testing**. Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

September 14-16, Washington, D.C. — **Structured Analysis, Design and Programming—Implementing Improved Systems Methodologies**. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Sept. 14-16, New York — **SAS Processing Course**. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

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COMPUTERWORLD'S ANNUAL HARDWARE ROUNDUP



By Tom Henkel
CW Staff

If you're shopping for a new computer system, it is probably no easier today to decide which processor best suits your needs than it was three years ago, when *Computerworld* published its first Hardware Roundup. If anything, the selection process has become more difficult.

The recession has left many companies hard-pressed to find the financial resources to buy computer systems. This means that acquisition plans are being scrutinized more carefully than ever before by top corporate management. In some cases, DP departments have been forced to make do with existing systems.

Evaluating processors has become more complex because processors tend not to last as long as they did. Data processing executives recently told CW that the useful lifespan of their processors has been reduced to less than five years [CW,

July 4]. Moreover, they added, their long-term capacity planning efforts are not as reliable as they once were. Some managers said they can only plan one or two years down the road; others have cut their planning efforts from five to three years.

In addition, the financial aspects of processor deals have also become incredibly complex. Some DP executives recently polled contended it is no longer possible for the DP department to evaluate and buy hardware without the assistance of their firms' legal and purchasing experts [CW, June 22].

Despite these impediments, the demand for DP power has never been greater, forcing users to evaluate their system needs constantly. Sometimes this means adding DP power, and sometimes it means just making sure that the system they have is the system they need.

As in the past, CW's Hardware Roundup is not provided as a buyer's guide. Our intent is to pro-

vide our readers with a summary of the processors currently on the market. This week, on Pages 30 through 39, we'll look at mainframes and superminicomputers; next week, minicomputers; and finally, in the Aug. 22 issue, microcomputers that can be linked to a larger system.

CW presents this information, in most cases, as it has been supplied by the vendors. CW does not endorse any vendor's product, architecture or methodology. In addition, unless otherwise noted, all information contained in the Hardware Roundup should be considered the vendor's claims.

Performance information in the Roundup's mainframe and supermini charts is meant to put individual processors into perspective with relation to the total marketplace. The categories showing relative performance and millions of instructions per second (Mips) ratings are approximations of how each processor will perform with normal, commercial work loads.

IBM Mainframes and . . .

	IBM							
Characteristics	System	4130A	4130B	4140	System/38 Model 4	System/38 Model 5	System/38 Model 7	System/38 Model 8
Relative Performance ¹		12	18	20	13	16	32	32
Mips ²		2	3	36	2	24	52	52
Memory Size in Bytes (Minimum-Maximum)		768K-1M	768K-2M	768K-2M	768K-2M	768K-2M	2M-4M	4M-8M
Purchase Price (Memory Size)		\$34,285 ³ (1M)	\$37,800 ³ (1M)	\$74,770 ³ (1M)	\$64,140 ³ (1M)	\$77,800 ³ (1M)	\$134,000 ³ (2M)	\$160,000 ³ (4M)
Lease Price (Lease Term)		\$1,100 (2 Year)	\$752 (2 Year)	\$2,600 (2 Year)	\$2,203 (2 Year)	\$4,175 (2 Year)	\$6,988 (2 Year)	\$8,400 (2 Year)
Machine Cycle Time (Nops)		1,500	Not Available	800	1,100 (Per 4 Bytes)	600 (Per 4 Bytes)	400 (Per 4 Bytes)	400 (Per 4 Bytes)
Channels (Minimum-Maximum)		None	None	None	1	1	1	1
Caches (Buffer) Size		None	None	None	None	None	None	None
Bus Architecture?		No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory		\$10,000	\$10,000	\$10,000	\$16,000	\$20,000	\$17,000	\$17,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different op-

erating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. For an A21 processor with 20M bytes of direct access storage.
3. For a B71 processor with 5M bytes of direct access storage.
4. For a B23 processor.
5. Includes integrated 65M-byte direct access storage device.

By Tom Henkel
CW Staff

Since Computerworld published its first Hardware Roundup in 1981, IBM has replaced its upper end processors with machines incorporating newer technology, vastly expanded its line of mid-range processors and announced a few additions to its low-end processor groups.

The industry giant has all but eliminated its top-end 3031, 3032 and 3033 processors. In their place, offering more power for less money, are the modular 3083, 3081 and 3084 processor groups.

The company dramatically expanded its mid-range 4300 series of mainframes from a four-processor line in 1981 to nine models today. Some industry watchers feel IBM may increase that number even further by announcing one or two more 4300 series machines, perhaps within the next year.

Since Computerworld's 1982 Hardware Roundup was published, IBM's systems strategy for the rest of the decade has become clearer. The strategy? To offer a line of modular processors, each of which can be upgraded to a larger, more powerful machine without having to scrap the original processor. IBM has sometimes been heard to refer to this strategy as a "building block architecture."

As part of that strategy, IBM during the past year announced a new top-of-the-line mainframe, the four-processor 3084. An entry-level 3081 processor, the Model G, also made its appearance; some industry watchers feel that machine is a technologically more advanced version of the original 3081 Model D.

IBM also expanded the 4341 line by adding the entry-level Model Group 9 and the high-end Model Group 12. Models were added to IBM's smaller mainframe systems, the 8100 and object-oriented System/38.

Vendors manufacturing IBM-compatible systems have kept pace with IBM announcements. Both Amdahl Corp. and National Advanced Sys-

	IBM									
Characteristics	System	4331	4331-11	4331-2	4341-8	4341-10	4341-1	4341-11	4341-2	4341-12
Relative Performance ¹		11	18	22	24	34	40	50	66	76
Mips ²		12	26	38	40	58	72	88	111	124
Memory Size in Bytes (Minimum-Maximum)		1M	1M-4M	1M-4M	1M-4M	2M-4M	2M-4M	2M-16M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)		\$64,000 (1M)	\$112,420 (1M)	\$112,500 (1M)	\$81,000 (1M)	\$170,000 (2M)	\$205,000 (2M)	\$240,000 (2M)	\$350,000 (4M)	\$500,000 (8M)
Lease Price (Lease Term)		None	\$5,830 (2 Year)	\$6,765 (2 Year)	\$6,400 (2 Year)	\$8,890 (2 Year)	\$8,940 (2 Year)	\$1,160 (2 Year)	\$14,490 (2 Year)	\$21,850 (2 Year)
Machine Cycle Time (Nops)		900 (Per 4 Bytes)	900 (Per 4 Bytes)	900 (Per 4 Bytes)	150-300 (Per 4 Bytes)	150-300 (Per 4 Bytes)	150-300 (Per 4 Bytes)	120-240 (Per 4 Bytes)	115-230 (Per 4 Bytes)	115-230 (Per 4 Bytes)
Channels (Minimum-Maximum)		2	0-2	0-2	3-6	3-6	3-6	6	6	6
Caches (Buffer) Size		None	8K	8K	8K	8K	8K	8K	16K	16K
Bus Architecture?		No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory		\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All

systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. For the processor only.
3. For the processor only.
4. For the processor only.
5. For the processor only.

	IBM					
Characteristics	System	3083-E	3083B	3083-J	3081 Model G	3084 Model K
Relative Performance ¹		185	277	370	500	1,282
Mips ²		3.1	5.7	7.9	11.4	18.8
Memory Size in Bytes (Minimum-Maximum)		8M-16M	8M-32M	8M-32M	16M-32M	16M-32M
Purchase Price ³ (Memory Size)		\$1,200,000 (8M)	\$2,000,000 (8M)	\$3,020,000 (8M)	\$3,260,000 (16M)	\$4,320,000 (16M)
Lease Price (Lease Term)		\$37,400 (4 Year)	\$65,400 (4 Year)	\$95,980 (4 Year)	\$110,485 (4 Year)	\$124,000 (4 Year)
Machine Cycle Time (Nops)		28	26	26	26	26
Channels (Minimum-Maximum)		6-18	8-24	8-24	16-24	16-24
Caches (Buffer) Size		Not Available	Not Available	Not Available	64K	64K
Bus Architecture?		No	No	No	No	No
Price per 1M Byte Of Main Memory		\$25,000	\$25,000	\$25,000	\$25,000	\$25,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All

systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. For the processor only.
3. For the processor only.
4. The 3081 processors employ dyadic, or two closely coupled, processors. The buffer size listed is per processor.

The Plug-Compatibles

(Charts Continued on Page 32)

NATIONAL ADVANCED SYSTEMS, INC.										
System	AS/6620	AS/6630	AS/6660	AS/7000H	AS/7000	AS/7000	AS/9040	AS/9050	AS/9060	AS/9080
Characteristics										
Relative Performance ¹	74	93	111	105	143	243	214	277	370	
Mips ²	1.6	2	2.4	1.8	2.7	5.4	4.9	6.1	7.8	
Memory Size in Bytes (Minimum-Maximum)	2M-16M	4M-16M	4M-16M	2M-8M	4M-16M	4M-16M	8M-16M	8M-32M	8M-32M	
Purchase Price ³ (\$)	\$350,000	\$465,000	\$580,000	\$1,050,000	\$1,300,000	\$2,075,000	\$1,300,000	\$1,400,000	\$2,400,000	
Lease Price ⁴ (Lease Term)	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	
Machine Cycle Time (Nsec)	60	60	50	72	72	40	40	40	35	
Channels (Minimum-Maximum)	5-8	5-8	5-10	5-8	8-16	12-16	8-16	8-24	8-24	
Caches (Buffer) Size ⁵	64K	64K	64K	12K	64K	64K	32K	64K	64K	
Bus Architecture ⁶	No	No	No	No	No	No	No	No	No	
Price per 1M Byte ⁷ Of Main Memory	\$10,000	\$10,000	\$10,000	\$50,000	\$50,000	\$50,000	\$18,750	\$18,750	\$18,750	

1. C/W estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different op-

erating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claim.
3. Includes processor, console, power supply and all peripherals.
4. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
5. Main memory enhancements are available in 2M, 4M, 8M and 16M-byte increments, depending on model.

and all peripherals.
6. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
7. Main memory enhancements are available in 2M, 4M, 8M and 16M-byte increments, depending on model.

tems, Inc. announced high-end and mid-range mainframes to match IBM's 3083 and 3084 announcements.

Two manufacturers of plug-compatible mainframes — IPL Systems, Inc. and Camber Corp. — announced systems to compete with IBM's trading 4300 line. IPL broke with tradition when it announced the 4480, a redundant processor that is compatible with IBM system software but is not directly comparable with a product in the IBM lineup. In the past, some industry watchers have viewed similar moves to be almost sacrilegious.

Two other makers of 4300-compatible machines have dropped out of the race in as many years. This year, financially troubled Magnuson Computer Systems, Inc. filed for protection from creditors under Chapter 11 of the U.S. bankruptcy laws, but the company vows that it is out of the race only temporarily. Control Data Corp. had dropped out of the race the year before, when it stopped marketing its Omega line of 4300-compatible processors and restricted its marketing efforts to IBM-compatible peripherals.

NATIONAL ADVANCED SYSTEMS, INC.					
System	AS/9040	AS/9060	AS/9080	AS/9070	AS/9080
Characteristics					
Relative Performance ¹	328	408	510	735	920
Mips ²	7.2	9	11.2	16.2	20
Memory Size in Bytes (Minimum-Maximum)	8M-32M	8M-32M	16M-32M	16M-32M	16M-64M
Purchase Price ³ (Money Base)	\$2,000,000	\$2,375,000	\$3,550,000	\$4,150,000	\$5,250,000
Lease Price ⁴ (Lease Term)	Variable	Variable	Variable	Variable	Variable
Machine Cycle Time (Nsec)	38	38	30	38	30
Channels (Minimum-Maximum)	8-24	8-24	16-24	16-32	16-32
Caches (Buffer) Size ⁵	64K	64K	256K	128K	512K
Bus Architecture ⁶	No	No	No	No	No
Price per 1M Byte ⁷ Of Main Memory	\$18,750	\$18,750	\$18,750	\$18,750	\$18,750

1. C/W estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different op-

erating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claim.
3. Includes processor, console, power supply and all peripherals.
4. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
5. The AS/9070 has two 256K-byte buffers and the AS/9080 has two 512K-byte buffers.
6. Main memory enhancements are available in 2M, 4M, 8M and 16M-byte increments, depending on model.

and all peripherals.
7. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.

AMDahl Corp.										
System	470V/7C	470V/7B	470V/7A	470V/7	470V/8	5840	5860	5880	5870	5860
Characteristics										
Relative Performance ¹	139	172	220	289	315	367	489	636	1,115	1,144
Mips ²	2.7	3.5	4.5	5.5	5.5	7.5	10	12	22.8	23.4
Memory Size in Bytes (Minimum-Maximum)	8M-16M	8M-32M	8M-32M	8M-32M	8M-32M	16M-32M	16M-32M	16M-64M	16M-64M	32M-64M
Purchase Price ³ (\$)	\$1,150,000	\$1,225,000	\$1,375,000	\$1,700,000	\$1,925,000	\$2,350,000	\$2,750,000	\$3,150,000	\$5,200,000	\$6,190,000
Lease Price ⁴ (Lease Term)	\$52,150 (4 Year)	\$54,285 (4 Year)	\$60,245 (4 Year)	\$65,310 (4 Year)	\$70,450 (4 Year)	\$71,298 (4 Year)	\$80,995 (4 Year)	\$102,541 (4 Year)	\$168,874 (4 Year)	\$197,415 (4 Year)
Machine Cycle Time (Nsec)	29	29	29	29	26	23.25	23.25	23.25	23.25	23.25
Channels (Minimum-Maximum)	8-16	8-32	8-32	8-32	8-32	16-32	16-32	16-32	16-32	32-64
Caches (Buffer) Size ⁵	32K	32K	32K	32K	64K	64K	64K	64K	128K	128K
Bus Architecture ⁶	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$37,500	\$37,500	\$37,500	\$37,500	\$37,500	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000

1. C/W estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems.

they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claim.
3. Includes processor, console, power supply and all peripherals.
4. NAS said it develops lease agreements on an individual basis and does not have a standard monthly lease list price.
5. The 5860 and 5880 have two 32K-byte buffers. The 5870 and 5890 have four 32K-byte buffers.

6. The 5860 and 5880 have two 32K-byte buffers. The 5870 and 5890 have four 32K-byte buffers.

COMPUTERWORLD'S ANNUAL HARDWARE ROUNDUP

The Plug-Compatibles

(Continued from Page 31)

IPL SYSTEMS, INC.					
Characteristics	System 4438	4443	4445	4448	4480
Relative Performance ¹	27	45	58	70	136
Mbps ²	43	41	94	1.2	2.2
Memory Size in Bytes (Minimum-Maximum)	2M or 4M	2M-8M	2M-8M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$151,080 (4M)	\$228,144 (8M)	\$254,700 (8M)	\$330,808 (8M)	\$243,800 (8M)
Lease Price (Lease Term)	\$6,180 (2 Year)	\$8,375 (2 Year)	\$9,905 (2 Year)	\$11,505 (2 Year)	\$13,540 (2 Year)
Machine Cycle Time (Nsec)	50	50	50	50	50
Channels (Minimum-Maximum)	3-6	3-6	6	8	10
Cache (Buffer) Size	None	8K	8K	24K	24K
Bus Architecture ⁷	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All

systems are not alike, they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claims.
3. Includes processor, console, power supply and all prerequisites.
4. Has two 256-byte buffers.

CAMDEX CORP.					
Characteristics	System 1636-1	1636-2	1641-1	1641-11	1651-1
Relative Performance ¹	28	36	40	52	60
Mbps ²	39	50	72	90	1
Memory Size in Bytes (Minimum-Maximum)	1M-4M	1M-8M	2M-16M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$95,000 (1M)	\$96,500 (1M)	\$150,000 (2M)	\$170,000 (4M)	\$245,000 (4M)
Lease Price (Lease Term)	\$5,500 (2 Year)	\$5,500 (2 Year)	\$7,500 (2 Year)	\$9,800 (2 Year)	\$9,800 (2 Year)
Machine Cycle Time (Nsec)	50	50	50	50	50
Channels (Minimum-Maximum)	3-5	3-5	3-5	3-6	3-6
Cache (Buffer) Size	None	8K	8K	8K	8K
Bus Architecture ⁷	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike, they use different operating systems, instruction sets and archi-

tectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. CW estimates.
3. Includes processor, console, power supply and all prerequisites.

NIXDORF COMPUTER CORP.			
Characteristics	System 8890 Model 30	8890 Model 50	8890 Model 70
Relative Performance ¹	15	30	41
Mbps ²	25	5	7
Memory Size in Bytes (Minimum-Maximum)	1M-2M	1M-4M	2M-8M
Purchase Price ³ (Memory Size)	\$61,885 (1M)	\$71,840 (1M)	\$130,490 (2M)
Lease Price (Lease Term)	\$1,785 (3 Year)	\$2,080 (3 Year)	\$3,760 (2 Year)
Machine Cycle Time (Nsec)	200	200	200
Channels (Minimum-Maximum)	2	4	5
Cache (Buffer) Size	None	None	64K
Bus Architecture ⁷	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$6,585	\$6,585	\$6,585

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike, they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claims.
3. For the processor, power supply, console and all prerequisites.
4. In addition to channels for attachment of IBM peripherals, Nixdorf 8890 processors are equipped with microprocessor-controlled I/O processors to which Nixdorf peripherals can be attached. There are eight such channels available on the Model 70, six on the Model 50 and four on the Model 30, the vendor said.



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SNA X.25

Other Vendors' Mainframes

(Charts Continued on Page 36)

By Tom Henkel

If the days of big mainframes are numbered, as some have predicted, no one has told the companies that make them. Nor has anyone told the users. In fact, users' past year, spurred the introduction of newer technology and better manufacturing techniques.

In addition to processors announced during the past year by IBM and the manufacturers of plug-compatible mainframes, all but one of the other vendors of large systems added at least one system to their product lineups since the 1982 Hardware Roundup was published.

NCR Corp., for example, greatly expanded its 9600 line of processors with both high- and low-end additions. And Control Data Corp. made major enhancements to its Cyber 800 series of large processors.

Other firms made more moderate enhancements to their product lines. Sperry Corp., for example, added a mid-range system to its 1100 line and announced a high-end version of its smaller System 80. Burroughs Corp. fulfilled a long-standing promise to bring out newer machines when it announced the B5920 and B4955 mid-range systems and the top-of-the-line B7900.

Honeywell, Inc. unveiled high-end additions to its mainframe lineup with the DPS 88/81 and 88/82.

The only mainframe vendor that did not expand its mainframe lineup was Digital Equipment Corp. The firm announced this spring that it does not plan to offer upgraded versions of its two mainframe processors, the Decsystem-10 and Decsystem-20 [CW, May 30].

NCR CORP.							
Characteristics	System	V-8545-E	V-8565-E	V-8585-E	V-8595-E	V-8675-E	V-8685-E
Relative Performance ¹		12	17	21	24	34	42
Size ²		2	25	37	42	61	75
Memory Size in Bytes (Minimum-Maximum)		1M-2M	1M-4M	2M-6M	2M-8M	4M-8M	4M-12M
Purchase Price ³ (Minimum-Maximum)		\$54,940 (\$1M)	\$61,290 (\$1M)	\$73,500 (\$2M)	\$88,870 (\$2M)	\$131,250 (\$4M)	\$208,150 (\$4M)
Lease Price (Lease Terms)		\$3,590 (3 Year)	\$3,974 (3 Year)	\$5,676 (3 Year)	\$7,017 (3 Year)	\$8,904 (3 Year)	\$13,419 (3 Year)
Machine Cycle Time (Secs)		84	56	36	56	56 ⁴	56 ⁴
Channels ⁵ (Minimum-Maximum)		1-6	1-6	0-8	0-8	0-8	0-8
Catch (Buffer) Size		None	None	None	None	None	None
Bus Architecture?		Yes	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory		\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems. They do not constitute a buyer's guide. All

systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. Dual processor.
5. For each processor.
6. NCR said each I/O channel is capable of supporting up to four strings of devices.

NCR CORP.							
Characteristics	System	V-8636	V-8645	V-8655	V-8665	V-8675	V-8685
Relative Performance ¹		51	96	100	140	163	275
Size ²		1	1.9	2	2.8	3.7	5.9
Memory Size in Bytes (Minimum-Maximum)		4M-6M	4M-16M	8M-16M	8M-24M	8M-32M	12M-48M
Purchase Price ³ (Minimum-Maximum)		\$495,000 (\$4M)	\$795,000 (\$4M)	\$995,000 (\$4M)	\$1,325,000 (\$8M)	\$1,585,000 (\$8M)	\$2,385,000 (\$16M)
Lease Price (Lease Terms)		\$14,667 (3 Year)	\$22,375 (3 Year)	\$26,630 (3 Year)	\$37,443 (3 Year)	\$44,375 (3 Year)	\$66,527 (3 Year)
Machine Cycle Time (Secs)		38 ⁴	38 ⁴	38 ⁴	38 ⁴	38 ⁴	38 ⁴
Channels ⁵ (Minimum-Maximum)		16-32	16-32	4-8	4-8	4-8	6-12
Catch (Buffer) Size		32K	128K	64K	160K	256K	384K
Bus Architecture?		Yes	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory		\$22,000	\$22,000	\$22,000	\$22,000	\$22,000	\$22,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems. They do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly

compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. Dual processor.
5. For each processor.

6. NCR said each I/O channel is capable of supporting up to four strings of devices.
7. Three-processor system.
8. Four-processor system.
9. Six-processor system.
10. Eight-processor system.

CONTROL DATA CORP.

Characteristics	System	Cyber 170/815	Cyber 170/825	Cyber 170/835	Cyber 170/845	Cyber 170/855	Cyber 170/865	Cyber 170/875	Cyber 170/885
Relative Performance ¹		32	53	106	208	311	437	687	1,227
Size ²		9	1.5	3.5	5.4	8	11	19	20
Memory Size in Bytes ³ (Minimum-Maximum)		262K-1,048K	262K-1,048K	524K-2,097K	524K-2,097K	262K-1,048K	262K-1,048K	262K-1,048K	262K-1,048K
Purchase Price ⁴ (Minimum-Maximum)		\$195,000 (\$262K)	\$320,000 (\$262K)	\$740,000 (\$240K)	\$1,275,000 (\$240K)	\$1,750,000 (\$240K)	\$2,175,000 (\$262K)	\$2,850,000 (\$262K)	\$3,225,000 (\$262K)
Lease Price (Lease Terms)		\$6,750 (3 Year)	\$8,806 (3 Year)	\$20,500 (3 Year)	\$35,400 (3 Year)	\$48,385 (3 Year)	\$72,500 (3 Year)	\$96,000 (3 Year)	\$107,500 (3 Year)
Machine Cycle Time (Secs)		50	50	56	64	64	25	25	25
Channels ⁵ (Minimum-Maximum)		12-24	12-24	12-24	12-24	12-24	12-24	12-24	12-24
Catch (Buffer) Size		None	None	2K-4K	2K-4K	2K-4K	None	None	None
Bus Architecture?		No	No	No	No	No	Yes	Yes	Yes
Price per 1M Byte Of Main Memory		\$10,000	\$10,000	\$20,000	\$35,000	\$35,000	\$84,000	\$128,000	\$128,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems.

2. They do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly

compared. In addition, actual relative performance may vary with the application, peripherals and software.
3. Vendor claims.
4. Includes processor, console, power supply and all peripherals.
5. For each processor.

6. CDC measures its main memory in words rather than bytes.
7. Includes processor, console, power supply and all peripherals.

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Other Mainframers' Systems

(Continued from Page 33)

HONEYWELL, INC.									
System	DPS 8/47	DPS 8/48	DPS 8/52	DPS 8/52	DPS 8/70	DPS 86/81	DPS 86/82		
Characteristics									
Relative Performance ¹	41-72	61-209	61-220	82-295	107-385	329	470		
Mbps ²	73-1.2	1.1-4.5	1.1-4.9	1.2-5.9	1.8-7.2	7.2	13		
Memory Size in Bytes (Minimum-Maximum)	2M-32M	2M-32M	2M-32M	2M-32M	2M-64M	16M-64M	16M-64M		
Purchase Price ³ (Memory Size)	\$153,000 (2M)	\$253,000 (2M)	\$450,000 (2M)	\$680,000 (2M)	\$900,000 (2M)	\$2,850,000 (16M)	\$4,050,000 (32M)		
Lease Price (Lease Term)	\$7,400 (6 Year)	\$10,000 (4 Year)	\$21,082 (5 Year)	\$25,504 (5 Year)	\$38,094 (5 Year)	\$91,200 (4 Year)	\$141,000 (4 Year)		
Machine Cycle Time (Msec)	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available		
Channels (Minimum-Maximum)	20	20	54	54	106	10-40	10-40		
Cache (Buffer) Size	32K	32K	32K	32K	32K	64K	128K		
Bus Architecture ⁷	No	No	No	No	No	No	No		
Price per 1M Byte Of Main Memory	\$10,000	\$10,000	\$25,000	\$25,000	\$25,000	\$70,000	\$70,000		

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All

systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application. Per-

ipherals and software

2. CW estimates.

3. For the processor only. Each of the models in the DPS 8 line can accommodate multiple processors.

DIGITAL EQUIPMENT CORP.				
System	Dec-system-10 1981-1	Dec-system-20 1981-2	Dec-system-20 1981-3	Dec-system-20 1981-4
Characteristics				
Relative Performance ¹	72	72	72	72
Mbps ²	1.3	1.3	1.3	1.3
Memory Size in Bytes (Minimum-Maximum)	1M-12M	1M-12M	1M-12M	1M-12M
Purchase Price ³ (Memory Size)	\$406,000 (1M)	\$466,000 (1M)	\$466,000 (1M)	\$466,000 (1M)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Msec)	133	133	133	133
Channels (Minimum-Maximum)	3-12	3-12	3-12	3-12
Cache (Buffer) Size	9K	9K	9K	9K
Bus Architecture ⁷	No	No	No	No
Price per 1M Byte Of Main Memory	\$20,000	\$20,000	\$20,000	\$20,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application. Peripherals and software

2. CW estimates.

3. For the processor, console, power supply, a minimum tape and disk configuration and all peripherals.

SPERRY CORP.									
System	System 80 Model 3	System 80 Model 4	System 80 Model 5	System 80 Model 6	System 80 Model 7	System 80 Model 8	System 80 Model 9	System 80 Model 10	System 80 Model 11
Characteristics									
Relative Performance ¹	12	14	16	21	42	46			
Mbps ²	20	20	26	37	70	76			
Memory Size in Bytes (Minimum-Maximum)	262K-4M	512K-4M	262K-4M	512K-4M	1M-8M	1M-8M			
Purchase Price ³ (Memory Size)	\$59,261 (262K)	\$98,082 (262K)	\$22,241 (262K)	\$94,062 (262K)	\$144,172 (512K)	\$958,182 (1M)			
Lease Price (Lease Term)	\$1,677 (5 Year)	\$2,066 (5 Year)	\$2,066 (5 Year)	\$2,256 (5 Year)	\$3,650 (5 Year)	\$21,605 (5 Year)			
Machine Cycle Time (Msec)	180	180	180	180	124	98			
Channels (Minimum-Maximum)	1 or 3	1 or 3	1 or 3	1 or 3	1-8	2-8			
Cache (Buffer) Size ⁴	None	None	None	None	None	32K			
Bus Architecture ⁷	Yes	Yes	Yes	Yes	Yes	Yes			
Price per 1M Byte Of Main Memory	\$23,284	\$23,284	\$23,284	\$23,284	\$14,400	\$45,064			

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly

compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claim.

3. Includes processor, console, power supply and all peripherals.

4. Memory is available with a disk cache memory ranging from 32K to 1M bytes.

BURROUGHS CORP.									
System	B165	B2225 ¹	B689	B692	B695	B7900-F			
Characteristics									
Relative Performance ¹	16	31	33	78	120	277			
Mbps ²	27	55	84	1.2	2.1	5.7			
Memory Size in Bytes (Minimum-Maximum)	524K-2M	1M-2M	3.1M-5.2M	3.1M-5.2M	5M	12M-20M			
Purchase Price ³ (Memory Size)	\$104,000 (524K)	\$119,800 (1M)	\$180,900 (3.1M)	\$377,000 (5.2M)	\$780,000 (5M)	\$63,000 (12M)			
Lease Price (Lease Term)	\$3,191 (3 Year)	\$4,302 (3 Year)	\$8,703 (3 Year)	\$11,968 (3 Year)	\$27,800 (3 Year)	\$86,277 (3 Year)			
Machine Cycle Time (Msec)	167 or 250	143	Not Available	Not Available	110	125			
Channels (Minimum-Maximum)	4-15	5-10	5-20	6-64	6-64	7-100			
Cache (Buffer) Size	8K	None	None	None	142K	18K			
Bus Architecture ⁷	No	No	No	No	Yes	No			
Price per 1M Byte Of Main Memory	\$12,000	\$12,000	\$19,000	\$20,000	Not Available	\$25,000			

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly

compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. CW estimates.

3. For the processor, console, power supply and all peripherals.

4. The B6920 uses a disk file processor in place of conventional disk processing.

5. Machine cycle time is 167 msec when operating at 4 MHz and 250 msec at 6 MHz.

SPERRY CORP.									
System	1100/81	1100/71	1100/61	1100/51	1100/41	1100/31	1100/21	1100/11	1100/01
Characteristics									
Relative Performance ¹	70	70	114	208	307	345	460	615	1,150
Mbps ²	1.2	1.2	2	4.5	5.8	6.4	7.5	14	20
Memory Size in Bytes (Minimum-Maximum)	2M-8M	2M-32M	2M-32M	2M-32M	4M-32M	4M-32M	8M-64M	8M-64M	8M-64M
Purchase Price ³ (Memory Size)	\$993,177 (2M)	\$325,620 ⁴ (2M)	\$1,554,587 (2M)	\$2,414,475 (2M)	\$4,242,872 (2M)	\$5,414,871 (2M)	\$2,865,980 (8M)	\$4,784,863 (16M)	\$11,212,948 (32M)
Lease Price (Lease Term)	\$13,077 (5 Year)	\$6,470 (5 Year)	\$29,045 (5 Year)	\$45,108 (5 Year)	\$79,226 (5 Year)	\$101,115 (5 Year)	\$86,740 (5 Year)	\$122,901 (5 Year)	\$171,472 (5 Year)
Machine Cycle Time (Msec)	118	118	50	50	50	50	30	30	30
Channels (Minimum-Maximum)	5-26	5-26	6-26	26-52	52-104	52-104	12-176	12-176	12-176
Cache (Buffer) Size	None	32K	18K-32K	32K-64K	96K-128K	96K-128K	32K	64K	96K
Bus Architecture ⁷	No	No	No	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	\$32,191	\$24,300	\$79,000	\$79,000	\$79,000	\$79,000	\$20,000	\$20,000	\$20,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems;

they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly

compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. Vendor claim.

3. Includes processor, console, power supply and all peripherals.

4. Purchase price includes a mass storage unit.

The Superminis

(Charts Continued on Pages 38 and 39)

By Tom Henkel
CW Staff

The superminicomputer industry, unsettled for the past two years as vendors introduced a flurry of new systems, appears to have stabilized. Instead of bombarding users with even more new systems, vendors during the past year extended existing product lines rather than adding new ones.

Data General Corp., which already had two models — the MV/6000 and MV/8000 — in its MV line of superminis, beefed up both the low and high end of that line of superminis when it announced the MV/4000 and MV/10000. (The MV/6000 is not included on the chart of DG offerings because the firm said it will be taken off the market in several months.)

Prime Computer, Inc. added the low-end 2250 to its Series 50 line, and Hewlett-Packard Co. did the same with the HP 3000 Model 39.

Perkin-Elmer Corp. also made some hefty additions to an existing product line — its 3200 series of superminis — when it introduced the low-end 3205, the high-end 3250XP and the top-of-the-line 3200MPS, a 32-bit central processor that can accommodate a variety of attached processing units.

BTI Computer Systems, Inc. announced a low-end processor, the BTI 5000, and Charles River Data, Inc. replaced its Universe 68 processor with the Universe 68/05 and Universe 68/37.

In contrast, Harris Corp. introduced two groups of superminis during the past year, the Harris 600 and 700; it is expected to announce soon a high-end 1000. The 600 and 700 processors replace the earlier Harris 80, 100, 300 and 500 superminis.

Other supermini vendors adjusted pricing on current models, while still others remained happy with their current lineup of processors and made few, if any, changes.

WANG LABORATORIES, INC.

System	V590	V5100
Characteristics		
Relative Performance ¹	45	87
Mips ²	77	13
Memory Size in Bytes (Minimum-Maximum)	1M-4M	512K-8M
Purchase Price ³ (Memory Size)	\$73,000 (1M)	\$105,000 (1M)
Lease Price (Lease Term)	\$2,920 (5 Year)	\$3,320 (5 Year)
Machine Cycle Time (Nsec)	480	480
Channels (Minimum-Maximum)	Not Available	Not Available
Cache (Buffer) Size	None	32K
Bus Architecture?	Yes	Yes
Price per 1M Byte Of Main Memory	\$12,000	\$12,000

1. CW estimate based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.

DIGITAL EQUIPMENT CORP.

System	VAX-11/730	VAX-11/780	VAX-11/780
Characteristics			
Relative Performance ¹	20	40	62
Mips ²	36	72	1.08
Memory Size in Bytes (Minimum-Maximum)	1M-5M	512K-8M	512K-8M
Purchase Price ³ (Memory Size)	\$38,000 (1M)	\$84,900 (1M)	\$184,000 (2M)
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	810	330	200
Channels (Minimum-Maximum)	1	1-5	1-8
Cache (Buffer) Size	None	4K	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$4,900	\$4,900	\$4,700

1. CW estimate based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply, systems software and a minimum tape and disk configuration.

HARRIS CORP.

System	Harris 600	Harris 700	Harris 800
Characteristics			
Relative Performance ¹	45	53	84
Mips ²	76	80	1.48
Memory Size in Bytes (Minimum-Maximum)	768K-4.5M	384K-12M	768K-12M
Purchase Price ³ (Memory Size)	\$24,900 (768K)	\$44,300 (384K)	\$139,000 (768K)
Lease Price (Lease Term)	Not Available	Not Available	Not Available
Machine Cycle Time (Nsec)	300	300	180
Channels (Minimum-Maximum)	24	24	31
Cache (Buffer) Size	None	8K	8K
Bus Architecture?	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$13,000	\$13,000	\$13,000

1. CW estimate based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimate.
3. Includes processor, console, power supply and all peripherals.

HONEYWELL, INC.

System	DPS 6/38	DPS 6/82	DPS 6/98
Characteristics			
Relative Performance ¹	16	38	38
Mips ²	24	82	62
Memory Size in Bytes (Minimum-Maximum)	1M-3M	1M-4M	1M-16M
Purchase Price ³ (Memory Size)	\$84,200 (1M)	\$126,000 (4M)	\$146,000 (16M)
Lease Price (Lease Term)	\$2,968 (5 Year)	None	None
Machine Cycle Time (Nsec)	330	300	300
Channels (Minimum-Maximum)	2-4	3-64	2-112
Cache (Buffer) Size	None	8K	8K
Bus Architecture?	No	Yes	Yes
Price per 1M Byte Of Main Memory	\$10,000	\$10,000	\$10,000

1. CW estimate based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimate.
3. Includes processor, console and ROM bytes of disk storage.

PRIME COMPUTER, INC.

System	Series 50 2250	Series 50 2900	Series 50 6600	Series 50 750	Series 50 880
Characteristics					
Relative Performance ¹	47	50	87	60	109
Mips ²	47	50	87	1	1.60
Memory Size in Bytes (Minimum-Maximum)	512K-4M	512K-2M	1M-4M	1M-8M	2M-8M
Purchase Price ³ (Memory Size)	\$36,000 (\$120K)	\$78,000 (1M)	\$111,000 (\$120K)	\$212,000 (1M)	\$355,000 (4M)
Lease Price (Lease Term)	\$600 (5 Year)	\$1,853 (5 Year)	\$2,609 (5 Year)	\$4,081 (5 Year)	\$8,249 (5 Year)
Machine Cycle Time (Nsec)	180	160	160	180	180
Channels (Minimum-Maximum)	1-5	3-8	14	14	13
Cache (Buffer) Size	2K	2K	8K	16K	32K
Bus Architecture?	No	No	No	No	No
Price per 1M Byte Of Main Memory	\$14,000	\$14,000	\$14,000	\$14,000	\$14,000

1. CW estimate based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. Includes PFT/100 CRT console.
5. Purchase price for add-in memory.

The Superminis

(Continued from Page 37)

APOLLO COMPUTER, INC.

System	DN 430
Characteristics	Computational Notes
Relative Performance ¹	40
Mips ²	72
Memory Size in Bytes (Minimum-Maximum)	512K-3.5M
Purchase Price ³ (Memory Size)	\$29,000 (1M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	400
Channels (Minimum-Maximum)	1-6
Cash (Buffer) Size	4K
Bus Architecture ⁴	No
Price per 1M Byte Of Main Memory	\$7,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, power supply and the vendor's Domain local-area network.

STRATUS COMPUTER, INC.

System	Stratus/32
Characteristics	Relative Performance ¹
Mips ²	52
Memory Size in Bytes (Minimum-Maximum)	2M-6M
Purchase Price ³ (Memory Size)	\$123,250 (2M)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	125
Channels (Minimum-Maximum)	2-14
Cash (Buffer) Size	None
Bus Architecture ⁴	Yes
Price per 1M Byte Of Main Memory	\$10,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. Yes.

CHARLES RIVER DATA SYSTEMS, INC.

System	Unknown	Unknown
Characteristics	80/100	80/127
Relative Performance ¹	60	60
Mips ²	45	45
Memory Size in Bytes (Minimum-Maximum)	256K-2.5M	256K-5M
Purchase Price ³ (Memory Size)	\$18,000 (256K)	\$22,300 (256K)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	320	320
Channels (Minimum-Maximum)	1-3	1-6
Cash (Buffer) Size	4K	4K
Bus Architecture ⁴	Yes	Yes
Price per 1M Byte Of Main Memory	\$4,500	\$4,500

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. CW estimates.
3. Includes processor, power supply, power supply and all peripherals.
4. Yes.

MICRODATA CORP.

System	Sequel Model 3200
Characteristics	Relative Performance ¹
Mips ²	34
Memory Size in Bytes (Minimum-Maximum)	512K-4M
Purchase Price ³ (Memory Size)	\$136,000 (512K)
Lease Price (Lease Term)	None
Machine Cycle Time (Nsec)	150
Channels (Minimum-Maximum)	8-128
Cash (Buffer) Size	None
Bus Architecture ⁴	Yes
Price per 1M Byte Of Main Memory	\$117

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. For the processor, a 10M-byte tape subsystem, a 13800-byte disk subsystem, four terminals and eight I/O ports.
4. Yes.

PERKINS-ELMER CORP.

System	3200	3210	3230	3250P	32000P
Characteristics					
Relative Performance ¹	25	50	50	150	250-1,050 ²
Mips ²	30	1.01	1.87	3.04	5-214
Memory Size in Bytes (Minimum-Maximum)	512K-4M	512K-4M	1M-16M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$24,950 (512K)	\$42,000 (256K)	\$74,150 (1M)	\$150,000 (2M)	\$185,000 (2M)
Lease Price (Lease Term)	None	None	None	None	None
Machine Cycle Time (Nsec)	Not Available	250	250	Not Available	Not Available
Channels (Minimum-Maximum)	1	4	1-8	1-32	1-32
Cash (Buffer) Size	None	None	1K	8K	8K ³
Bus Architecture ⁴	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte Of Main Memory	\$4,900	\$9,000	\$9,000	\$9,000	\$9,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. The 32000P can support multiple attached processors.

COMPUTER DESIGNED SYSTEMS, INC.

System	Advisor 32/80	Advisor 32/90
Characteristics		
Relative Performance ¹	198	475 ²
Mips ²	4.2	14.8
Memory Size in Bytes (Minimum-Maximum)	256K 8M	256K 8M
Purchase Price ³ (Memory Size)	\$20,000 (1M)	\$20,000 (1M)
Lease Price (Lease Term)	None	None
Machine Cycle Time - (Nsec)	125 ⁴	125 ⁴
Channels (Minimum-Maximum)	16-128	16-128
CACHE (Buffer) Size	256K	256K
Bus Architecture ⁴	Yes	Yes
Price per 1M Byte Of Main Memory	\$62,000	\$62,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. Includes processor, console, power supply and all peripherals.
4. The 3280 processor is available with an IBM-byte, 50 nsec read-only memory which noticeably enhances performance.

FORMATION, INC.

System	F4000 Model 100	F4000 Model 200	F4000 Model 300	F4000 Model 400	F4000 Model 500
Characteristics					
Relative Performance ¹	12	14	20	15	22
Mips ²	29	32	36	24	36
Memory Size in Bytes (Minimum-Maximum)	256K-8M	256K-8M	256K-8M	256K-8M	256K-8M
Purchase Price ³ (Memory Size)	\$67,000 (1M)	\$70,000 (1M)	\$82,500 (1M)	\$87,000 (2M)	\$123,400 (2M)
Lease Price (Lease Term)	None	None	None	None	None
Machine Cycle Time (Nsec)	800	800	800	800	800
Channels	0-4	0-4	0-4	0-4	0-4
Cash (Buffer) Size	None	None	None	None	None
Bus Architecture ⁴	Yes	Yes	Yes	Yes	Yes
Price per 1M Byte	\$10,000	\$10,000	\$10,000	\$10,100	\$10,100

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 40. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
2. Vendor claims.
3. For the processor and main memory only.
4. The 4000 Model 300 attached processor operates only under IBM's VM/370 operating system.

The Superminis

GOULD, INC. BEL COMPUTER SYSTEMS DIVISION

System	Concept 32/8758	Concept 32/8759	Concept 32/8760
Characteristics			
Relative Performance ¹	144	144	255
Mips ²	2.6	2.6	5.4
Memory Size in Bytes (Minimum-Maximum)	2M-3M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$199,300 (2M)	\$235,000 (2M)	\$330,000 (2M)
Lease Price ³ (Lease Term)	Not Available	Not Available	Not Available
Machine Cycle Time (Nsec)	75	75	75
Channels (Minimum-Maximum)	0-38	0-38	0-38
Cache (Buffer) Size	32K-64K	32K-64K	64K-128K
Bus Architecture ³	Yes	Yes	Yes
Price per 1M Bytes Of Main Memory	\$9,500	\$9,500	\$9,500

- CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
- CW estimates.
- For the processor, 3M bytes of main memory; 75 nsec bytes of disk storage, a tape unit and systems software.
- In the chassis configuration there are 38 I/O slots available. Twenty-one are reserved for the processor. The balance can be used for other devices such as memory in the base 2M disk configuration, 16 slots are available for high-speed I/O device controllers. I/O processors can attach to any one of those slots. Up to four I/O processors can be attached to a single processor. Those devices can handle additional devices, the vendor said.

DATA GENERAL CORP.

System	MP/4000	MP/6000 II	MP/10000
Characteristics			
Relative Performance ¹	36	71	138
Mips ²	8	1.2	2.5
Memory Size in Bytes (Minimum-Maximum)	1M-8M	1M-4M	1M-16M
Purchase Price ³ (Memory Size)	\$63,400 (1M)	\$126,250 (1M)	\$211,070 (2M)
Lease Price (Lease Term)	None	None	None
Machine Cycle Time (Nsec)	200	220	140
Channels (Minimum-Maximum)	2	2	3
Cache (Buffer) Size	None	16K	16K
Bus Architecture ³	Yes	Yes	Yes
Price per 1M Bytes Of Main Memory	\$4,900	\$4,900	\$4,900

- CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
- CW estimates.
- For the processor with disk and tape units, system software and system console.

HEWLETT-PACKARD CO.

System	HP 3000	HP 3000	HP 3000	HP 3000
Characteristics				
Relative Performance ¹	32	32	32	84
Mips ²	26	56	56	1.1
Memory Size in Bytes (Minimum-Maximum)	512K-3M	1M-3M	2M-4M	3M-8M
Purchase Price ³ (Memory Size)	\$42,400 (512K)	\$72,400 (1M)	\$109,500 (2M)	\$275,614 (3M)
Lease Price (Lease Term)	None	None	None	None
Machine Cycle Time (Nsec)	105	105	105	75
Channels (Minimum-Maximum)	3-12	3-12	3-18	3-48
Cache (Buffer) Size	None	None	None	8K
Bus Architecture ³	Yes	Yes	Yes	Yes
Price per 1M Bytes Of Main Memory	\$12,000	\$12,000	\$12,000	\$12,000

- CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
- CW estimates.
- Includes processor, console, power supply and all peripherals.

BTI COMPUTER SYSTEMS

System	BTI 8000	BTI 8000
Characteristics		
Relative Performance ¹	10	35
Mips ²	3	59
Memory Size in Bytes (Minimum-Maximum)	64K	512K-16M
Purchase Price ³ (Memory Size)	\$36,800 (64K)	\$160,000 (2M)
Lease Price (Lease Term)	None	None
Machine Cycle Time (Nsec)	350	200
Channels (Minimum-Maximum)	4	4-32
Cache (Buffer) Size	None	None
Bus Architecture ³	Yes	Yes
Price per 1M Bytes Of Main Memory	Not Available	\$22,000

- CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All systems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.
- CW estimates.
- For a 2M-byte processor including power supply and all peripherals.

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EDITORIAL

Ducked Soup

Before a master chef pronounces a soup ready to be served to the dining public, he usually tastes it to make sure it meets his standards. Should software be afforded any less attention to quality before it is consumed by its users?

Interviews with consultants and users recently conducted by *Computerworld* revealed that testing and debugging of software is still an afterthought, rather than a priority, at many DP installations [CW, Aug. 1]. Managers are not necessarily to blame for giving testing short shrift. They are burdened with a seemingly endless applications backlog, impossible deadlines, unrealistic requirements and users who would just as soon build their own applications on a microcomputer as pick up the phone and call DP.

The problem is compounded by the unfortunate fact that software testing is a thankless task. It's time-consuming (one expert estimated that testing realistically makes up 50% of the project cycle), and its benefits ultimately go unnoticed. DP managers get few letters complimenting them on the lack of errors in their programs. Consequently, it is difficult to motivate programmers to devote much effort to the job.

But like a master chef, a DP manager is not likely to win many satisfied customers if the product coming from his kitchen is below par. Quality may not always be noticed, but mediocrity always is.

A change in attitude is essential to approaching the problem. First, managers and programmers alike need to acknowledge that they make mistakes and learn to deal with them constructively. "We call them 'bugs' because we can't stand the word 'errors,'" said one executive at a recent conference. Structured walk-throughs and other test-as-you-go techniques not only catch errors before they become catastrophes, they teach programmers to write better code.

Secondly, managers should familiarize themselves with the testing literature and software testing aids that are becoming available as the problem generates more attention. A number of books on the subject have appeared in recent years, and more than 100 testing packages are commercially available.

Thirdly, DP departments should stop accepting impossible requirements from users. Of course the user wants an application with 100% uptime and response that can be measured in microseconds. But can he live with requirements that are more realistic? The key is to reach an understanding with the user, not just to throw your hands up in the air in disgust.

And finally, managers must make an effort to build time for testing into the applications development cycle. This task should not be, as one consultant noted, "one of those things that seems to get cut out in an attempt to meet a delivery deadline."



'My Dear, I Worship the Very Seat You Sit Upon.'

LETTERS

The FCC Decision

The article "FCC Approves Production of Non-AT&T Interfaces" [CW, June 20] covers the Federal Communications Commission (FCC) decision in Docket 81-216. In that order (FCC 83-268), the commission ordered denuclearization of channel service units and channel service unit-like network channel terminating equipment (NCTE) on digital network service offerings.

What the article did not point out is that:

- The decision was based on a Bell Laboratories system structure that won't exist in less than six months.
- The ultimate ramifications could be highly detrimental to the long-term viability of the former Bell operating companies.
- The order is immediately damaging to the interests of small manufacturers.
- The presumption that lower prices for end users will result is highly speculative and may in fact never materialize.
- The order could lengthen and will definitely complicate the prospect of fully achieving the integrated service digital network (ISDN) architecture.

I will address each of these points. First, the order is alleged to wrest from AT&T control over the manufacture and provision of channel service unit/NCTE, but divestiture has already provided for that, especially given the assignment of all existing Digital Dataphone Service hubs to the Bell operating companies. NCTE is the terminating point for local distribution linkage, which is the province of the local operating companies (including the former Bell operating companies). In 1984, these entities will have no financial affiliation with either AT&T or Western Electric.

Second, the order removes from the local telephone companies' core business one more piece of end-to-end architecture. Having been stripped of telephone equipment and inter-Lata Access and Transport Areas (Lata) carriage, the Bell operating companies also lost the DSU business. Now the FCC has shifted the interface past the channel service unit.

Since inter-Lata carriers are not precluded from intra-Lata operations, and terminal suppliers (other than American Bell, Inc.) are not precluded from supplying bypass transport, not only are the operating companies the only industry players with delimiting business boundaries, but those boundaries are apparently to be continually chipped away at without regard to the consequences.

My third concern is the immediate and longer term damage done by the order to small channel service unit/NCTE manufacturers. A number of Bell operating companies have been buying and/or negotiating to buy general trade NCTE. The order will bring an immediate end to that if upheld.

Fourth, to the degree that the incremental cost of direct end-user marketing must be supported by channel service unit prices, the hoped-for lowering of user outlays may never materialize.

My last point focuses on the ultimate attainment of the long-standing technologists' dream of an ISDN architecture. My personal belief is that the FCC's action in Docket 81-216 will make such an architecture infinitely more difficult to achieve by the Bell operating companies because they will not be able to count on the availability of compatible intelligence at the customer end of the loop.

R.S. Norington

San Francisco, Calif.

DATA PAST

Five Years Ago Aug. 7, 1978

WASHINGTON, D.C. — The Carter administration issued policy guidelines governing the security of computer systems operated within the federal government.

The guidelines placed responsibility for efforts to protect personal data on the shoulders of executive branch department and agency heads.

Ten Years Ago Aug. 8, 1973

WASHINGTON, D.C. — The computer community is no longer fit to regulate itself, at least where individual privacy is concerned, said Attorney General Elliot L. Richardson, echoing a special government advisory committee.

The committee recommended the development of ethical standards.

LECHT ON SCIENCE/Charles P. Lecht

For Whom the Bell Tolls . . . For Free

A protean cyclone of new technology rages and swirls about, its currents sustained by the collision, mutual perfusion and ultimate synthesis of the communications and computer industries. In the process, advances in each industry lend additional impetus, meaning and purpose to the other.

So personal computers have their traditional, intrinsic powers magnified and extended through participation in networked system structures, while the networks have their communications capabilities distributed across an ever-wider spectrum by virtue of the computer systems, from micro to macro, by which they find themselves involved. Successive interconnections that have the effect of linking the mini-network contained in every computer system to local-area networks, and thence to nationwide and global networks, are occurring with such rapidity, we barely notice that certain, older communications features remain doggedly resistant to essential change.

Among these, we find our old friend, the homely telephone ring. The philosopher Parmenides would have loved its faithfully unchanging nature; the patriarch Obivian Kenobe might have used it as an icon for truth, if not agelessness. It is our enduring signal to someone that we are reaching out to touch him — electronically — to communicate. The bell that causes the ring is the symbol of our largest communications company and of our national identity. The ring itself may yet come to symbolize liberty of another sort: freedom from telephone bills, the secret desire of everyone, everywhere.

Use of the telephone ring alone —

'Our old friend, the homely telephone ring. The philosopher Parmenides would have loved its faithfully unchanging nature; the patriarch Obivian Kenobe might have used it as an icon for truth, if not agelessness. It is our enduring signal to someone that we are reaching out to touch him — electronically — to communicate. The bell that causes the ring is the symbol of our largest communications company and of our national identity. The ring itself may yet come to symbolize liberty of another sort: freedom from telephone bills, the secret desire of everyone, everywhere.'

that is, bereft of any subsequent vocal message — to convey information is a particularly well-known commonplace in the everyday world of very low-speed communications. "Ring twice and hang up" — so the errant child has long been adjusted to reassure his frugal mother of a safe arrival at school or camp or wherever.

For as long as the telephone has been around to lend meaning to such advice, those simple, inevitable words of wisdom have expressed the desire of (almost) every parent everywhere that his children learn to succeed in one of life's most rewarding, risk-free and enduring riffs — still the phone company by sending a cost-free message.

Sending Messages

Increasing levels of this "sophistication" have been achieved by telephonic correspondents through their assignment of equivalences between numbers of rings and letters, numbers, words, even whole concepts,

according to prearranged (that is, encoded) sequences: in short, the cost-free use of a costly facility. Numbers of rings to hang up, duration of hang-up and position of any particular ring sequence within a message: All of these but suggest the richness of content of which a telephone ring-based language is capable, for free — and for the very patient. Only lack of personal time and for the quiet perils of boredom have served to compromise this otherwise appealing technique for sending a message while achieving the ultimate economy.

Comes the computer to rescue us from even these blemishes upon the fair face of this free telephone service. If we were to put today's communicating computers on-line, such inhibitory factors as time and boredom could largely be circumvented.

Using one computer to encode the message to be sent into telephone rings, and the other to decode it into text, the only time needed is of the impersonal computer kind. Number dialing would be nearly instant.

neous, the message sent could, in theory, be virtually endless, and no line charges would ever be incurred. The receiving computer would not answer the telephone, but rather receive incoming (soundless) rings as binary bits in the string of such bits that comprised the message for later decoding into letters, numbers, words, phrases, punctuation and so forth. This communications technique is now practical for messages much longer than "arrived safely." However slow it might appear at first glance, most of today's commonly used, costly alternatives are much slower.

Transmitting for Free

Since in developed countries, we can elicit a telephone ring on average once every five seconds, 8-bit ASCII code, commonly used to represent data in today's computers, could be transmitted at the rate of one character per 40 seconds. Allow a yet more generous 20 seconds for circuit delays, and we come up with one ASCII character per minute. This means that on average, we could transmit, gratis, one word every six minutes and, thus, a 300-word page of text, including spacing, in 1,800 minutes, or 30 hours.

So in roughly one day, an unattended personal computer could send a one-page letter to any mailbox memory anywhere in the U.S. and many places abroad without incurring a cent of communications charges. Message transmission speeds increased by more than 50% could be achieved through representation of each character by any number of encryption techniques, including

(Continued on Page 44)

HUMAN CONNECTION/Jack Stoner

Hard Work, Self-Study Sometimes Pay Off

Horatio Alger, my man, step aside and make way for your 20th century counterparts.

Yet another reader has forwarded his glowing story of starting into the data processing business from the bottom and in a few short years, rising to the dizzying heights of DP manager. But this was not done by overly impressing executives with a computer science degree (this person never even made college) or by claiming to have developed the ultimate solution to the global command and control problem, but by dint of excruciatingly hard work, unending hours of nighttime self-study and undeterred ambition.

But I relate this story for reasons other than for the purpose of human-interest entertainment. First off, the history of this individual exemplifies the very best of what a trainee can do for a firm and at a price so low that it's almost vulgar. Even more important, it seems to me, is that the driving spirit and determination that dominates his attitude constitutes a world-class model for all those experienced (and inexperienced) profes-

sionals who conduct themselves as prima donnas, yet couldn't make it in a high-school production of the *Milk and Honey*. Here is the essence of his letter:

"My first interaction with computers was literally on the outside looking in. I used to peer through the plate-glass windows of the computer room complex of the bank for which I worked as a bookkeeper, reflecting on the people there and wondering what was so remarkable about them and why I couldn't perform in the same role."

Getting Management's Attention

"Certainly, bookkeeping skills weren't going to get me into the computer profession, so I took the tack of getting management's attention in a less dramatic, but nevertheless effective, way. I became the best bookkeeper the bank ever hired," he said. "Rewards came quickly. I was promoted to bank teller after a few months and immediately set for myself the goal of the most exemplary teller ever employed there."

"Soon my big break into DP came, but in a most innocuous way: I was

asked to help out in the computer room. But that was all the toehold I needed. While working days as a subliminary operations assistant, I ferried armloads of manual books home at night, reading and studying for hours. Only a short while later, I was a very proficient operator."

"The lead operator quit because of job frustration, and I was given the job. I trained two other operators in record time and not too long after, developed a reputation of the best operator ever employed by the bank. Naturally, during this period, I buried myself under a pile of programming manuals, looking ahead to advancing my career, and one day received encouragement in this direction when the bank offered to pay for a three-day programming class."

"Another promotion and I was an assistant programmer, an entry-level position. They tossed the junk jobs I was, like documenting old software, but the task taught me flowcharting and other techniques in a hurry. I stayed for several more years doing all the dirty work, but picking up knowledge every step along the way."

"I decided to leave when it became apparent that my career at the bank was dead-ended, mainly because, I believe, the DP manager was reluctant to move me ahead too quickly. But I had paid my dues to the industry, earning bank wages (low pay, that is) in exchange for the experience."

Into a One-Man Shop

"I took a position with a small oil and gas firm as DP manager, analyst, programmer and systems operator — a one-man DP shop — to get a new system on the air," he said. "Within a few years, I doubled my salary and received access to all educational programs in exchange for one major thing from me: giving the company 100% of my capability every working day — and they get it."

"How do novices break into DP? Through low-level jobs, low pay and hard work and more work."

"If they show a true desire to learn and display that desire in action, then no matter what the educational background, they can build and maintain successful DP careers."

READER COMMENTARY/Douglas R. Bybee

Classical Organizational Structure Key to Successful DP Shop

"During a lifetime travelling in the data processing marketplace, from technical writer to teacher to manager, from government to university to private industry, I slowly became aware of an evident, but unspoken, reality: Some industry-specific data processing functions always work effectively, and some industry-specific data processing functions never work effectively."

Even among akin enterprises, the phenomenon rings true: University DP always works and secondary school DP never works; banking data processing never works and government financial agencies data processing never works; local law enforcement (police) data processing always works and the combined criminal/civil justice components of state government data processing never works. I am sure that you can add to the list.

Ask a university the cost of teaching a program unit, and then ask for the same program unit in terms of cost by instructional and noninstructional costs. You will receive an immediate DP-supported answer. Ask the same question of a local school district, and you will be referred to a public information officer who will "get back to you later."

The trait common to enterprises that always have successful operations is that they have arrived at classical organizational structures.

I am not using the word "classical" haphazardly. It has a specific definition in the world of organizational theorists. If you are a DPer with a desire to read and learn organization theory and/or behavior, you will find yourself swimming in a sea of terminology that makes a data processing text read as clearly as Dick and Jane.

Organizationalist's and behaviorist's language suffers from a lack of specificity. Suffice it to say that you find nearly as many definitions of the term "organization" as you find articles on the subject. Terms such as "organizational multiplier," "dynamic expediency models" and "Maslow-need hierarchy" also labor under ominous clouds of capricious definition.

Your search will also subject you to prolix and labyrinthine books on the subject. A 1972 book by M. and M. Knewell, *Introduction to Group Dynamics*, listed a bibliography of over 5,000 articles, and their work centered around only small groups.

Organizational Theory

I think I can walk you out of the maze. There are only two real schools of organizational theory:

- **Structural.** Structuralists believe relationships are not once and for all prescriptions, but are rules of the game that are adaptable to changing situations, and the changing desires of the participants, and need to accommodate changing work flow and human perspectives.

- **Classical.** Classicalists believe deductive reasoning dictates the one best organizational design for any

entity whatsoever.

Structural thought is new and classical is old. No right-thinking person any longer believes that there is one best structure for an organization; but I disagree. Where data processing is concerned, I propose that there is one best structure for an entire industry and that those industries that have discovered that one best way always have a data processing function that works. Conversely, those enterprises that have not yet discovered the correct structure never have a data processing function that works.

In the interest of brevity, I offer a comparison of two endeavors that at the surface appear at opposite ends of the information requirements

"The trait common to enterprises that always have successful operations is that they have arrived at classical organizational structures. Structural thought is new and classical is old. No right-thinking person any longer believes that there is one best structure for an organization; but I disagree. Where DP is concerned, I propose that there is one best structure for an entire industry and that those industries that have discovered that one best way always have a DP function that works. Conversely, those enterprises that have not yet discovered the correct structure never have a DP function that works."

spectrum, but which in reality are strikingly similar: the university and the prison. One is dominantly automated, the other is dominantly manual.

To an outsider — those of us working in the "real world" — the thought of working in the idyllic world of university data processing would appear a piece of cake; but we are dead wrong.

In addition to teaching, which falls under the auspices of university management, one finds all the responsibilities associated with operating an extensive business and running a small city. Don't think for one minute that university managers are movie prototype, eggheads, theoretical, little-to-do personalities. A more appropriate image would be that of working long hours, being business trained and spending time negotiating medical service contracts, selecting architectural alternatives and dealing with labor unions. Their positions about as secure as major league baseball managers. Being a university manager is a pressure-filled job.

To an outsider, the thought of working in the circumscribed world of correctional (prison) data processing would appear to be a piece of cake; here again, we are dead wrong. In addition to securing, which

falls under the auspices of prison management, one finds all the responsibilities associated with operating an extensive business and operating a small city. Don't think for a minute that correctional institution managers are the movie prototype potbellied, abrasive, little-to-do personalities. A more appropriate image would be that of conscientious, 24-hour-a-day, master-degreed persons spending their time negotiating medical service contracts, reviewing architectural alternatives and dealing with labor unions. Their positions are about as secure as major league baseball managers. Being a correctional institution manager is a pressure-filled job.

Universities operate extensive physical plants, maintain large inventories, feed thousands daily and run personnel systems, payroll systems, registration/scheduling systems, the entire gamut of financial systems, sophisticated logistical control systems (room and class assignments), grading systems, recreation programs and student payroll systems; they may even operate farms and support a radio station.

Automated Universities

Everything at a university is automated. If a university official wants a trust fund account balance, he will query via a CRT and receive an immediate up-to-date balance; he may even receive a year-end account projection. It is cause catastrophic if a university data processing operation is a few cents off on a daily point-of-sale balance.

Correctional facilities operate extensive physical plants, maintain large inventories, feed thousands daily and run personnel systems, payroll systems, registration/scheduling systems, the entire gamut of financial systems, sophisticated logistical control systems (cell and program assignments), grading (evaluation) systems and recreation programs; they may even operate farms and support a radio station.

Little, if anything, within the correctional world is automated. If a prison official wants a trust fund accounting balance, he will query a ledger card to know the balance at last posting (maybe last month), and it will cost a lot more than the CRT inquiry. It is cause celebrate if a correctional data processing operation can count the number of inmates.

The difference? Universities have isolated, independent information components and have arrived at a classical organizational structure to serve these components best; correctional operations have not. Universities recognize that they have four major computing requirements:

- Academic computing.
- Business computing.
- Library computing (often requiring interface with other external university systems).
- Student service/record computing.

The size of the university will dictate. (Continued on Page 44)

A seminar on IDMS/R.



Seminars on Cullinet's relational database management system, IDMS/R, will be held in the following cities during the next few weeks.

Atlanta, GA	September 11
Augusta, GA	September 11
Austin, TX	September 15
Boston, MA	September 20
Calgary, ALTA	September 15
Charlotte, NC	September 22
Chicago, IL	September 7
Cincinnati, OH	September 12
Cleveland, OH	September 19
Columbus, OH	September 11
Dallas, TX	September 7
Des Moines, IA	September 28
East Claire, WI	September 13
Evansville, IN	September 27
Grand Rapids, MI	September 15
Hartford, CT	September 14
Houston, TX	September 29
Indianapolis, IN	September 20
Jacksonville, FL	September 29
Kansas City, MO	September 22
Lanham, MD	September 7
Los Angeles, CA	September 21
Leuven, Belgium	September 7
Marietta, GA	September 20
Miami, FL	September 29
Milwaukee, WI	September 13
Minneapolis, MN	September 8
Montreal, Q.U.E. (Eng.)	September 13
Montreal, Q.U.E. (Fr.)	September 15
Nashville, TN	September 13
New Orleans, LA	September 29
New York, NY	September 21
New York Long Island, NY	September 13
New York, NY	September 7
Norfolk, VA	September 28
Ottawa, ONT	September 29
Ottawa, ONT	September 13
Parthian, NJ	September 23
Philadelphia, PA	September 28
Sacramento, CA	September 27
St. Louis, MO	September 6
Salt Lake City, UT	September 27
San Diego, CA	September 13
San Francisco, CA	September 15
Seattle, WA	September 20
Seattle, WA	September 28
Toronto, ONT	September 15
Toronto, ONT	September 27
Tucson, AZ	September 28
Washington, DC	September 7
Wichita, KS	September 20
Winnipeg, MB	September 28
Worcester, MA	September 22

For information on attending a seminar on the IDMS/R system

in your area, contact Cullinet at (617) 339-1000

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Title _____

Company _____

Address _____

Operating Environment _____

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As a true relational system, it allows you to select data from separate and unrelated files; join it, then project it in ways that make it possible for you to handle small-scale applications and unstructured end user requests for information quickly, directly and intelligently.

What's unique is that IDMS/R also allows you to handle high-volume production applications with the proven technology best suited for the job.

It's this marriage of architectures that makes Cullinet's relational DBMS stand apart. In fact, where others have tried to propose relational or pseudo-relational components that exist separately from the production database, Cullinet's is the only one that lets both work together. Thus serving the whole corporation by serving all of the needs within it.

The answer is software.

And software is Cullinet.

Shops With Classical Organizations Succeed

(Continued from Page 42)

take the extent of independence it affords its information components. For example, a fairly large school may organizationally sever academic computing from other components, or a very large school may have completely autonomous data processing research operations in individual programs.

A small school of a few thousand students, on the other hand, may centralize; but if it does, the data processing function is traditionally placed outside the jurisdiction of any individual data processing user. In addition, it will always have units that complement the four major information components. The only way a university would change its

Taking example from their university reflections, prisons might best structure their external interface responsibilities outside the jurisdiction of the correctional agency and establish applications units to serve the other information requirements. Additionally, as size affords, they might decentralize institutional computing to the jurisdiction of the individual prisons.

classical structure would be if it were to develop a new major information component, say, manufacturing.

Correctional information requirements are:

- Business computing.
- Inmate record keeping computing.

• Institutional management computing (guard scheduling, visitor screening, program scheduling, meal planning, inmate property records and so on).

• External criminal justice interface computing.

In this latter capacity, correctional

facilities are the incarceration component of the annual (law enforcement and trial (courts) criminal justice cycle. The only organizational consistency in correctional data processing is its inconsistency.

Taking example from their university reflections, prisons might best structure their external interface responsibilities outside the jurisdiction of the correctional agency and establish applications units to serve the other information requirements. Additionally, as size affords, they might decentralize institutional computing to the jurisdiction of the individual prisons.

Through periods of increasing population and decreasing population, adequate finances and little money, stability and high employee turnover and good and poor management, the classical university organizational structure will eventually intimidate it to succeed. Correctional systems DP is likewise always organizationally directed to fail.

Isolate your requirements, organize to service them and you'll have an environment that is ready to embrace success. If you do not organize correctly, you are bent to doom.

Bybee is president of Downstate Media, Inc., a DP consulting firm in Dixon, Ill.

The Bell Tolls for Thee

(Continued from Page 41)

ing, for example, variable bit Hamming code — a system that correlates the frequency of appearance of characters with the number of bits used to represent them. The more frequent the character, the fewer the bits — and this would be all the truer of a ring-lingo that was industry-specific.

Need I go on? The software needed, on both ends of the line, is decidedly trivial — so far that matter is the hardware device required to accept and pass on the rings to the receiving computer. All the rest is in place. Assuming that we could achieve an average transmission rate of 20 sec/char, a one-page letter could be sent in less than 15 hours. Federal Express now charges \$27 for this, while the Post Office settles for a gentlemanly \$9. Even electronic mail or telex involving one's own and the receiving party's facilities generates all kinds of costs that would be absent, because unnecessary, in the simple-minded system I am postulating here.

Is what I have described here illegal? If so, we must swear in as deputies our unemployed (and then some) and dispatch them with orders to arrest all the miscreant grandmas, daddies, lovers and miscellaneous honorable kids who regularly ring the bejabbers out of our telephones day in and day out for nothin'. Anyway, it's not illegal.

Talk about stifling Bell out of its toll! May the Phone, and its Force, be with you — for free.

Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

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Contracts: 90% of the Game

We appreciate Thomas K. Christo's reader commentary "DP Contracts Don't Leave Users Defenseless" [CW, June 13], which responds to our reader commentary "Negotiate Contract Clauses at the Beginning" [CW, March 21].

Contrary to Christo's suggestions, we are in fundamental agreement with what he has to say. In fact, he confirms the thesis of our article: In a computer dispute, the contract, like pitching in baseball, is 90% of the game.

Everything written into the contract should be presumed to have legal significance. If either party is dissatisfied with the terms of the contract, it may be extremely difficult to avoid the legal consequences of those terms. Accordingly, before the contract is signed, the user should be fully aware of the impact of any contractual restrictions, and the vendor should take care to see that the contractual protections sought are in fact being obtained.

We do take issue with some of the specific points that Christo raises. First, the contractual relationship between a buyer and a seller is not a black-and-white question of morality. While it may be true that the buyer of a relatively inexpensive personal computer is not in a position to negotiate contract terms, our experience has shown that large-scale business purchases are often subject to renegotiation at the insistence of the buyer. This is particularly true in today's highly competitive market. Moreover, the law imposes an obligation of good faith and fair dealing on the vendor, and the vendor runs the risk of losing contractual protection if overreaching is found.

Second, we think that Christo overstates the ease with which a plaintiff may circumvent contractual restrictions. While it is true in theory that tort remedies will not be barred by contractual restrictions, asserting these remedies is easier said than done. In most states, fraud requires a showing of actual intent to deceive. Negligent manufacturing cases have become an endangered species since the advent of the Uniform Commercial Code, and in any event, most states exclude the recovery of lost profits and other economic damages in negligence cases.

Third, Christo asserts that state consumer-protection laws give significant buyer's remedies. We are not aware of any reported cases in which buyer recoveries have been sustained independently under state consumer-protection acts. If Christo is aware of cases that we have missed, we would appreciate being so informed.

Finally, Christo expresses the view that jury waiver clauses are invariably asserted for the benefit of the vendor and to the detriment of the user. Computer plaintiffs should be reminded, however, that they have the burden of proof; sustaining that burden will mean educating the trier of fact about the technology and the facts of the case.

If the trier of fact understands nothing at the conclusion of the case, the plaintiff will lose. Therefore, even plaintiffs should consider the potential advantages of trying their cases to a judge who will have avail-

able such resources as law clerks and court-appointed experts.

Prospective plaintiffs should also consider the fact that a case tried to a judge generally results in a written opinion. We do agree, however, that context is important in computer disputes.

In representing users, the relative bargaining position of the parties and any disparity in their respective levels of expertise in computers should be underscored.

James J. Marcellino

Attorney

John M. Conley

Attorney

Gaston Snow & Ely Barlett
Boston, Mass.

LETTERS

Readable Cobol

I fail to understand the point of Jerry Sitner's article "Turn to Yesterday's Cobol to Up Productivity" [CW, June 27] and reader commentary "Coding Clarity the Key to Productivity" [CW, July 4]. What is "broken Cobol"? Does he really believe that, for instance, "IS GREATER THAN" is more readable than ">"? I vastly prefer the latter, especially when reading a program on a CRT, where display space is at a premium. And as far as management reading programs goes, I have it on good authority that the last time a manager read a program was on May 17, 1973. Sitner should read up on his histo-

ry. According to "History of Programming Languages" (Association for Computing Machinery Monograph Series, edited by Richard L. Wexelblatt), Cobol was developed in a few months by a small group of people with the intention of defining a stopgap language to be used for a few years until the real thing came along.

Unfortunately, the industry couldn't decide what that was and invested heavily in Cobol. The so-called wisdom of the Cobol designers seems only to be due to management inertia.

Finally, I would like to see a definition of "clarity coding." Without an objective measure, Sitner's so-called productivity tool is useless.

J. Steven Piegge
Project Leader
McDonnell Douglas Automation Co.
St. Louis, Mo.

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Fourth-Generation: A Simple Solution?

By Edward B. Kellogg
Special to CWI

For a long time after multifunctional computers had become commonplace, there was a dichotomy between the people who originated and used the information that the computers processed and the people who programmed the computers to process the information. Now, innovative programming techniques are putting programming capability within reach of the end user.

In this article, Kellogg advises end users to consider just how much capability is within their grasp at present before the fanfare with which fourth-generation languages are being heralded encourages them to dismiss their existing sources of programming support.

If you think about it, the apparent simplicity of fourth-generation lan-

guages hides an extraordinarily complex substructure that the vendor's technical writers end your computer will interpret in their own particular ways.

If you are lucky enough to survive the teething period and get your system up and running, you may encounter hidden levels of complexity in your own operational and informational needs. You may find them only if you analyze your entire environment and the ways in which it might change.

Suppose that instead of calling up a salesman of a fourth-generation system you rubbed your desk lamp the wrong way and it produced a genie who offered to redesign your office to order in two days. You would begin by looking at such things as size and capacity. Giv-

en enough knowledge of the inner workings of a proposed package and some experience, systems experts can tell you if the system you want to implement will suit the computer where you propose to run it.

The next step is to determine that categories under which data is filed are related to the various subdivisions of tasks in your office. With data base systems, these issues are bound together by the discipline of data base design. Your fourth-generation language genie probably will lock you into one of the two major systems of data base design: relational and hierarchical or owner/member set design.

True relational systems offer the greatest flexibility, but there is a cost in (Continued on Page 50)

Accounting Package Targets Mainframes Running DOS, OS

JERICHO, N.Y. — Computer Associates International, Inc. has introduced an on-line, interactive real-time accounts payable package for IBM and plug-compatible mainframes running under DOS or OS.

CA-Accounts Payable was designed to provide information on cash requirements and availability through on-line inquiry and printed reports. Transactions that are entered using the package are automatically posted to appropriate journals, the vendor noted.

Fully integrated with Computer Associates' complete line of business software packages, CA-Accounts Payable reportedly features optional vendor cut-off date for release of full or partial payment vouchers; a preliminary check register that reports all checks to be printed; both manual and automated check processing; debit and credit memo processing; automatic or selective discounting; multibank processing; and a variety of flexible reports on a periodic or as-needed basis.

CA-Accounts Payable is priced at \$30,000 for IBM OS systems and \$27,500 for IBM DOS systems. Computer Associates said from 125 Jericho Tpk., Jericho, N.Y. 11753.

File-Sharing Package

IBM Micro Gets 'Tempus-Link'

MONTREAL — Micro Tempus, Inc. has announced Tempus-Link, an intelligent file-sharing software package for IBM mainframes that was designed to enable users of IBM Personal Computers to access virtual floppy disks on mainframes running CICS, TSO and VM/CMS by using existing communications links.

Tempus-Link is comprised of systems and communications software for the Personal Computer and mainframe software

that manages Vsam files set up as boxes of virtual floppy disks on mainframe direct-access storage devices. Up to 255 virtual floppies, each between 32K- and 15M bytes, reportedly can be contained in each of an unlimited number of boxes assigned to each user.

These files can then be accessed by mainframe programs using utilities supplied by Micro Tempus and by Personal (Continued on Page 48)

FQS Extends Query to DL/1

WOBBURN, Mass. — Altergo Products, Inc. has announced a release of its Friendly Query System (FQS). Release 1.2 makes the product's on-line query capabilities available to users of IBM's DL/1 data base management system operating under DOS or OS with CICS or Altergo's Shadow II teleprocessing monitor.

With regard to DL/1, FQS reportedly makes it possible to process queries against DL/1 files and/or any other standard files using the standard file control facilities of the host teleprocessing monitor (either CICS or Shadow II). FQS runs as a transaction under the teleprocessing monitor and uses a combination of menu, prompts and Help facilities.

Reports can be constructed based on field level selection criteria without the user needing to know how the file is held, the vendor said.

Facilities added to increase the power of FQS reporting include a form of JOIN command to link two files logically and treat them as one. Array handling has been introduced, as well as a sort option, maxime and minima statistics, totals and averages and formatting enhancements.

The enhanced version of FQS is available for \$15,000 for a DOS version and \$18,000 for an OS version. More information is available from Altergo Products, 400 W. Cummings Park, Woburn, Mass. 01801.

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Running Under VOS

Oracle DBMS Available for Harris

FORT LAUDERDALE, Fla. — Oracle Corp.'s Oracle relational database management system (DBMS) is now available for use on Harris Corp.'s superminicomputers running under the latest release of VOS.

A major feature of the Harris Oracle DBMS is its integrated interactive data dictionary, the vendor noted. The user can employ interactive commands in SQL — an IBM-developed query language — to query the data dictionary in the same manner as other data base tables. This reportedly allows determination of data base table names, tables and views to which users have access or names of table columns. Data base managers

can selectively grant access to data tables dynamically and interactively.

Oracle is available for the Harris systems from the Computer Systems Division of Harris. It carries a

'Stat80' Written in Portable Fortran

SALT LAKE CITY, Utah — Statware has announced an interactive statistical package written in portable Fortran.

The software is available for Digital Equipment Corp. Decsystem-10, Decsystem-20 and VAX-11 computers, Sperry Corp. 1100s, Data General Corp. machines and Hewlett-Packard and Co. HP 3000 mainframes.

\$40,000 licensing fee and a \$350 monthly maintenance charge.

More information is available from Harris, 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Stat80 is said to feature user-friendliness, extensibility and a procedures facility. Procedures are stored in a Stat80 library and executed when needed.

The software carries an introductory price of \$1,000. Maintenance costs \$500 per year. Statware can be reached through P.O. Box 510881, Salt Lake City, Utah 84145.

'Fastcode' Cuts Coding Time On System/38

MINNETONKA, Minn. — A shorthand programming language for the IBM System/38 was recently announced by Help/38 Systems, a division of Advanced Circuits, Inc.

Fastcode, which the vendor said reduces programmer coding time on System/38 programs by as much as 80%, is entered with IBM's Source Entry Utility using RPG-III formats and is converted into RPG-III source, according to the vendor.

The company said that a study of coding techniques of RPG-III programmers showed that programmers use the same pattern of coding to write programs 90% of the time. Fastcode incorporates those patterns, and the company reported that on the average, one character of Fastcode will create five characters of RPG-III.

Fastcode will be available in September for a \$20 monthly licensing fee or a one-time cost of \$968. More information can be obtained from Help/38 Systems, 15102 Minnetonka Industrial Road, Minnetonka, Minn. 55343.

'Tempus-Link' Announced

(Continued from Page 47)

Computer users under IBM's PC-DOS. Five Tempus-Link commands have been added to PC-DOS to enable the user to specify the box and virtual floppy within the box, as well as to establish levels of file protection. File access is further controlled by user-established passwords.

The vendor noted that the management information systems department maintains full control over the number of Tempus-Link users, the creation of files, access to master files and security.

A small 2K-byte memory-resident program runs on the Personal Computer under DOS 1.1 or 2.0 on Personal Computer-compatibles under Microsoft, Inc.'s MS-DOS 1.1 or 2.0.

One feature of this program is the ability of Personal Computer users to communicate with each other over the existing corporate Systems Network Architecture network rather than over public dial and packet networks, thereby increasing data security, the vendor added.

Instead of RJE and asynchronous dial-up ports to support Personal Computers, the users reportedly can employ emulation cards that connect the micro to the mainframe, making it appear to be an IBM 3278.

The pricing of Tempus-Link is based on the mainframe portion. The micro portion is free and can be copied at will, the vendor said. The mainframe is set up to allow a given number of concurrent users. The basic start-up license is \$995 for the first user; charges decline as new users are added. For 200 concurrent users, the license fee would be \$195 per user.

More information is available from Micro Tempus, located at 4 Farnham, Place Bonaventure, P.O. Box 1339, Montreal, Quebec, Canada H5A 1H1.

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	\$ Amount	Total	26797.96	25000.00	18033.35	16777.50
	Percentage of Total Sales		55.8	67.9	67.6	56.8
30000 to 500000	Quantity	Total	80.0	13500	13200	11600
	\$ Amount	Total	12781.06	20011.00	20024.00	18010.00
	Percentage of Total Sales		28.7	39.6	52.6	62.0
Under 30000	Quantity	Total	6000	5131	None	1011
	\$ Amount	Total	7628.00	9996.00	None	2034.00
	Percentage of Total Sales		19.5	17.7	None	8.2



Fourth-Generation Veneer May Hide Inner Complexity

(Continued from Page 47)

performance efficiency because they are supposed to let you set up your files as simple tables and then create changing and possibly ad hoc schemes for tying them together.

Hierarchical and owner/member set data base systems force certain kinds of relationships on your data from the outset. You must consider which ones are appropriate for you.

Each fourth-generation system presents a different variation on one of the major design themes. However, the literature can create tremendous confusion, and you may have to study the operating manuals to find out what a particular vendor's use of words like "relational" means to you.

The next area to consider is how much the fourth-generation package will change your environment, relationships and communications technologies with regard to interfacing internally and with outside organizations. Although fourth-generation systems may be thought of as generalized tools like Fortran or Cobol, they often must be tailored so closely to a particular application that restrictive design and communications constraints are introduced.

Some Examples

Striking examples of powerful but dangerous simplification are the well-known electronic spreadsheet systems, pioneered by VisiCorp's VisiCalc. While they are not truly fourth-generation systems, as discussed here, such products enable you to build and reuse a very complicated analysis model from the data you key in. However, you cannot easily put data from an outside source into a model you have already built, although you can read in the raw data and then rebuild the model around it.

You also cannot easily consolidate the key results of one model's calculations into another model or communicate them back to another application system.

Fourth-generation language vendors tell you that you can develop systems with their products "from scratch," but at "scratch" you may not really understand your requirements.

There are basically two alternatives, neither of which will provide a simple solution to your problems. You will either need to learn the logical principles of requirements definition and systems design or learn by trial and error, using system prototypes that you can easily make and then improve on with the newest systems.

To improve your own chances of success, you should be able to see how your needs relate to the solutions on the market, and you should be prepared for the frustrations of systems development with which the computer department has always lived. You cannot allow vendors of simple-looking systems make you think your business is simple. You should demand and be prepared to use a system that provides for all the complexities of your work while remaining easy to use.

Kellogg is a senior applications pro-

grammer/analyst in the Applications Group, Office for Information Technology of the Harvard University Computing Center in Cambridge.

Manufacturing Package Expanded

SUNNYVALE, Calif. — The Maxcim manufacturing and financial software package for manufacturers has been expanded with five modules, according to NCA Corp.

The modules are scheduled for delivery over the next several months and will be available on Maxcim's Digital Equipment Corp. VAX-11 configuration.

Added to the previous line of 17

Multiprocessor DBMS Released

KINGSTON, N.J. — A multiprocessor version of its data base management system (DBMS) has been announced by Advanced Data Management, Inc., a division of Aeronautical Research Associates.

modules are: Human Resources Management System, comprising payroll and personnel, which provide an on-line centralized data base; Financial Planning Spreadsheet Module; the Project Management Module; and Decision Support System.

Licensing prices for individual modules start at \$5,000 from NCA, 388 Oak Mead, Sunnyvale, Calif. 94086.

DRS/MP, the recently introduced option of the DRS DBMS, runs on multiple Digital Equipment Corp. VAX 11/780 computers coupled with DEC's MA780, according to the vendor. It allows users on up to four VAX 11/780 computers to access a common data base distributed across the multiprocessor system.

The system, offered as an optional enhancement of a single-processor DRS, features a centralized buffer pool for data base update and access and user-callable resource locking to minimize contention between users in large communities.

The multiple VAX option is available for \$10,000 from Advanced Data Management, 15-17 Main St., Kingston, N.J. 08528.

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The standard 9465 is an outstanding entry level value. The base price includes: 1280 X 1024 X 4 resolution, 280 display processor, graphics processor and video lookup table. All in one compact desktop unit. A special package price of \$14,995 includes a color monitor.

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280 is a registered trademark of Sharp Inc.
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'Caci/DDS-4' Enhanced For Honeywell's DM-IV

MECHANICSBURG, Pa. — Caci, Inc.-Federal has released an enhanced version of Caci/DDS-4, its data dictionary, directory and documentation system for users of Honeywell, Inc.'s DM-IV data base and transaction processing software.

The package is designed to act as a central repository for documentation of all application programs and includes a map of all data entities and their relationships. The data dictionary includes information about data elements, programs and applications systems affecting data and user or-

ganizations responsible for maintaining the data.

Although Caci/DDS-4 is primarily designed for a Honeywell DM-IV environment, it reportedly can be adapted to any software/hardware environment that supports ANSI Cobol-74 and Codelay-compliant data base management systems. Both batch and on-line processing are used to update the data dictionary. The package supports both hard-copy reports and on-line inquiries.

The package costs \$23,800 from Caci, Inc.-Federal, Mechanicsburg, Pa. 17055.

For VAX-11s Under VMS

Program Generator Updated

BERKELEY, Calif. — Bytel Corp. has announced a version of its Cogen program generator for Digital Equipment Corp.'s VAX-11 minicomputers under DEC's VMS operating system.

Cogen replaces coding processes for building applications with prompts and "painting" techniques, a spokesman said. The product utilizes precoded skeleton modules, imposes consistent coding standards, generates modules that can be used across applications and ensures portability.

The VAX version incorporates a descriptive terminal data base that is expandable depending upon the types and features of the terminals it supports. The data base is part of a

screen handler package that offers an optimized, multiple-frame screen management resource and a key-to-function mapping resource.

Cogen for VAX/VMS is priced at \$7,500. It will be available in September from Bytel at 1730 Solano Ave., Berkeley, Calif. 94707.

QMS Programs Said to Manage Quality Control

PRINCETON, N.J. — A series of software modules designed to manage manufacturing quality control information has been announced by John A. Keane and Associates.

QMS Programs are 32 functional software modules written in Ansi 77 Fortran that form a real-time integrated data management system, the vendor said.

Using data taken directly from the laboratory or production line, QMS reportedly generates action reports for immediate decisions, summary reports for quality control management and detailed analysis of data for statistical quality control.

The vendor said the QMS Programs can be user-modified to meet specific needs in different application areas and can be adjusted to such market conditions as new materials and new products.

Object code prices start at \$8,000. More information is available from John A. Keane and Associates, 20 Nassau St., Princeton, N.J. 08540.

'Screen Handler' Gets Enhanced

LOS ANGELES — Xerox Computer Services, Inc. has announced enhancements to its Screen Handler software, which reportedly processes data input from Digital Equipment Corp. terminals to Xerox Corp. financial, manufacturing and distribution systems running on DEC VAX-11 minicomputers.

The Screen Handler features field editing and data line blocking and unblocking. New screen building procedures allow the user to build application screens using the DEC standard text editor to create a screen source file used as input to a screen generation program, according to a vendor spokesman.

Other enhancements to the Screen Handler include: systems messages are displayed on the last line of the screen, preventing the possibility of input to unprotected fields; terminal input can be captured in a journal file when running application programs and later input to a program in batch mode; and an option feature that allows information to be written to the system accounting file.

The Screen Handler supports DEC VT311 and VT332 terminals and is included free of charge with the file maintenance application, which sells for \$10,000. More information is available from Xerox Computer Services at 26 Springdale Road, Cherry Hill, N.J. 08003.

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This deskside system is available in an economical off-the-shelf version or can be user-configured, allowing you to tailor the 9465 to a wide range of applications needs. As an added benefit, the modular design of the 9465 allows for easy on-site upgrades.

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Digital Screen Simulation by Digital
Productions, Los Angeles, CA
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Support Services Bow for VAX/VMS

HARVARD, Mass. — An array of professional support services for users of Digital Equipment Corp.'s VAX/VMS has been announced by SIS, Inc.

The services have been designed to provide VAX-11 installation support tailored to meet individual customer needs, according to SIS. Consulting and contracting services such as feasibility studies, application systems

designs and programming for VAX-11 systems in Cobol and Basic are provided.

Additional services include a design review service that evaluates system designs and tailors them for implementation in a VMS environment; programming services with system-level languages such as PL/I, Pascal and C; and customized in-house training courses.

Services start at \$40 per

hour and are available on contract rates. Further information is available from

Gregory W. Wallace, SIS, Inc., 487 Pinnacle Road, Harvard, Mass. 01451.

Finance Tools Out for IBM

WHITE PLAINS, N.Y. — Insight Software Systems, Inc. has announced the availability of its Insight Financial Management System and Insight General Ledger packages on the IBM System/36.

The products are written in native mode for each computer, a spokesman said.

The financial management system costs \$12,000, and the general ledger system costs \$15,000 from insight at One N. Broadway, White Plains, N.Y. 10601.

Sales Aid Targets Wang VS

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced a Sales History (S/H) package written in Cobol for the Wang Laboratories, Inc. VS family of computers.

S/H is said to use automatically the data and results generated by MCBA's accounts receivable and customer order processing packages to create 19 reports.

A source code license for the software costs \$2,000 for use on the first computer. MCBA is headquartered at 2441 Honolulu Ave., Montrose, Calif. 91020.

IBM Gets Modules

OAK BROOK, Ill. — Michael, Ross & Cole Ltd. has announced MRC-Manager, an integrated series of modules that allow access to IBM System/38 data base information.

The product is a subset of the company's MRC-Query Series designed for nontechnical end users. MRC-Manager includes the MRC-Dictionary, MRC-Reporter, MRC-Grapher modules which give the user the ability to create reports, bar graphs or on-line inquiries to data base information.

Features include multifile access, multilevel security and Help key support.

The product is offered at a limited-time introductory price of \$3,990. Each module may be purchased separately for \$1,140. The company is located at Suite 501, 1301 W. 32nd St., Oak Brook, Ill. 60521.

'Mako-Doc' Fits System/34

KIRKSVILLE, Mo. — Mako Consulting has announced an IBM System/34 RPG-II documentation system.

Mako-Doc is said to allow analysis of literals and indicators used in a single, group or all programs in any library. It also reportedly makes available a data dictionary listing for single, group or all programs in any library.

The menu-driven software costs \$275, with a two-week trial available for \$25. Mako Consulting can be reached through P.O. Box 698, Kirksville, Mo. 63501.

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Quality Control Option Out

CAMBRIDGE, Mass. — A manufacturing quality control (QC) option for users of the Research System (RS/1) software has been introduced by the BBN Research Systems Division of Bolt Beranek and Newman, Inc. RS/1 runs on Digital Equipment Corp. VAX-11 computers under VMS and Unix operating systems and DEC PDP-11s under RT-11, RSX-11 and IAS operating systems.

The RS/1 Quality Control Analy-

sis Option graphics, statistics and analysis package is said to aid the design of manufacturing QC procedures when used with RS/1 software. The QC analysis routines take data in RS/1 tables as input and produce RS/1 tables and graphs.

RS/1 costs between \$16,000 and \$30,000, depending on configuration, and the QC Analysis Option costs \$4,000 from 10 Moulton St., Cambridge, Mass. 02236.

Financial Tool Aids VAX-11s

TAMPA, Fla. — A general ledger and financial reporting package for Digital Equipment Corp.'s VAX-11 family of 32-bit minicomputers was recently announced by Collier-Jackson, Inc.

C/J Advanced General Ledger, according to the company, allows the user to define and produce reports at any level of the organizational structure and assume total control of the contents and appearance of reports via a financial report generator. On-line inquiry features provide immediate access to financial status of the

entire organization, organization groups, individual departments or specific accounts, the vendor said.

The package, including training and installation, is available for a license fee of \$18,000. Further information is available from Collier-Jackson, Inc., 5406 Hoover Blvd., Tampa, Fla. 33614.

Icap Targets Expatriate Data

NEW YORK — Organization Resources Counselors, Inc. (ORC) has

announced a service that is said to enable companies to process expatriate compensation data on microcomputers. The service is available to users of the company's International Compensation Tables.

Called the International Compensation Capsule (Icap), the service comprises a diskette and monthly computer-produced reports on ORC's recommended expatriate allowances for up to 300 overseas locations. Monthly changes in data on goods and services and housing allowances can be made to produce balance sheets for employees.

Diskettes are available for the microcomputers from IBM; Apple Computer, Inc.; Hewlett-Packard Co.; and Radio Shack. The annual charge for Icap is \$1,200 from ORC at Rockefeller Center, 1211 Ave. of the Americas, New York, N.Y. 10036.

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Gould 'Lips' Version Debuts For IP8500 Video Processor

SAN JOSE, Calif. — Gould, Inc.'s DeAnza Imaging and Graphics Division has made a major addition to its Library of Image Processing Software (Lips).

Lips Version 3.0 reportedly will allow the Gould DeAnza IP8500's Digital Video Processor to transform a 512- by 512-pixel image into a complex 16- to 32-bit, block floating, Fast Fourier Transform (FFT) in 1.5 minutes. Version 3.0 also introduces an extensive intensity transformation program and a statistics and "training-set acquisition" package as a base for Bayesian classification.

Also, while 20 image FFTs may occupy a conventional computer for a full day, it can be completed in one hour on the IP8500 with Lips 3.0.

The IP8500 Lips 3.0 software package is available to DEC VAX/VMS or PDP-11 RSX-11M users for \$5,800, including a one-year update sub-

scription. The FFT package may be ordered as a Lips 3.0 option for an additional \$2,200. Gould's DeAnza Division is located at 1870 Lundy Ave., San Jose, Calif. 95131.

Dylakor Unveils DYL-270 Utility For IBM CPUs

GRANADA HILLS, Calif. — Dylakor has announced the availability of DYL-270, a utility and data management package for IBM 360, 370, 30 series, 4300 series and plug-compatible mainframes running under OS, DOS and SSS operating systems.

DYL-270 is activated by statements using English commands and keywords. It reportedly can print graphics in graphics, hexadecimal and graphics or hexadecimal-only format and can aid in conversions from one disk device to another and in operating system conversion. User routines can be written in Cobol, Fortran or Assembler, Dylakor said.

DYL-270 is available for \$1 per day under a 60-day trial period offer and can be leased from \$90 a month. For information, contact Dylakor, 17418 Chatsworth St., Granada Hills, Calif. 91344.

System Offers Info Manager For Law Firms

COLUMBIA, Md. — GP Information Systems has announced a new information management system for law firms which combines business management functions such as time accounting, productivity measurement and accounts receivable/cash flow analysis with information storage and retrieval functions such as word processing, litigation support and library management.

Based on Pick & Associates, Inc.'s Pick operating system, the software is available for the following computers: IBM under Pick; Prime Computer, Inc. with the Prime Information operating system; Honeywell, Inc. and Digital Equipment Corp. with Pick sold by Ultimate Computer Corp., an OEM; NCR Corp.'s NCR/ Applied Digital Data Systems Mentor; and Datamedia Corp. and Altos Computer Systems, Inc. hardware.

The business management package, called the Law Management System (LMS), includes time accounting and billing, accounts receivable and general ledger. Features include client billing, productivity and profitability analysis.

The Law Office Information Management and Retrieval System, called Seek, is for functions like litigation support, conflict of interest, work product tracking, case tracking, attorney calendaring, central files tracking and library management.

Prices start at \$17,000 for LMS and \$40,000 for Seek. GP Information Systems is located at 10650 Hickory Ridge Road, Columbia, Md. 21044.

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has been designed from the ground up as a total information/communications system. Which means that each system is actually a self-contained network. A network that encompasses interprocessor communications in a single system at one physical location, and extends all the way to a 255-system configuration spread across the globe.

levels of responsibility. That means that you can place the information you deal with most on your local system, giving you better response times for your users, lower communication costs, and independence from any problems that might occur at other points in the network.

In addition, because each location needs different kinds of information, you can place up front which departments can access what kinds of data. This control can be established at corporate headquarters, with appropriate local controls implemented at each site as well. The result is that network-wide data is always available for corporate-level reporting and management, while the appropriate local data is available for managerial decision-making at each department, office or facility.



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THE KEY IS A SINGLE, DISTRIBUTED DATABASE

This flexibility in the movement of information at different levels and locations within an organization



Boise/Production

is in part the result of the next logical step in distributed information management: the truly on-line, distributed database.

Because Tandem's unique ENCOMPASS™ DBMS actually distributes a single, unified database across the entire network, your users get two important advantages: first, no matter where they are on the network, they can access data from anywhere else, without having to know where that data is located.

And second, by simply entering information at their local terminal, your users are instantaneously updating every single node in the system — automatically.

The only restrictions are the ones that you define up front; namely, which users can access which data, and what they are allowed to do with it. That way, you have total control over the entire system.

Relating data to information.

The key to manipulating data in such a simple, straightforward manner is Tandem's high-performance relational database. Because setting up files merely involves creating or filling in tables with data records, no device-dependent "pointers" are used



Chicago/Corporate

know up front exactly what your configuration will be. Or how — and when — it might change again.

That way, you start only with what you need, and add or shift processors, peripherals, and com-

At corporate headquarters, management has network-wide access to continuously updated information for operations and reporting.

to maintain relationships, making the database extremely easy to use.

New files can be set up at any time, in any location — just by adding new tables or more rows to existing ones. This allows you to reconfigure

Boston/Engineering

your data files as needed, transferring the most often used files to the local node. So you can be continually fine-tuning your system, moving your data to where it makes the most sense, with no penalties in performance. In the process, you are reducing the float on information by dramatically lowering user response time, as well as saving network resources and increasing overall system performance.

WHEN YOU NEED IT WITHOUT FAIL

The most important prerequisite for an on-line, distributed database is the ability of the system to ensure consistent and available data. And Tandem is the industry standard by which all other systems are judged.

From the CPU itself (which was rated more reliable than that of any other major computer vendor in the most recent report on maintenance by the International Data Corporation), to our new satellite links, the entire system is maximized for completely fault-tolerant operation.

This is achieved through the use of multiple processors, high-speed dual bus communications, mirrored discs and multiple power supplies. If any component fails, the corresponding device or alternate data path automatically takes over and

performs the function. And the defective unit can be repaired or replaced without shutting down the system.

The data protection solution.

What happens when many users want to access the database at the same time? Or when a power failure interrupts system operation?

Tandem's multiple hardware modules aren't the only protection the system provides for your data. On the software side, our ENCOMPASS database manager includes a special subset called the Transaction Monitoring Facility (TMF), which is devoted solely to ensuring network-wide data integrity and recoverability.

With TMF, the system maintains an audit trail of all transactions, protects files from access when the database is in an intermediate state, and provides complete backup

Atlanta/Warehouse

and roll-forward recovery procedures if a transaction cannot be completed for any reason. So you get complete protection against database contamination by component failure or power outage.

In addition, Tandem's GUARDIAN™ operating system

complements the ENCOMPASS database manager to oversee all aspects of NonStop architecture, further ensuring that all database linkages are consistent at each node of the network.

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Whether it's a two-processor system or a 255-system global network, the Tandem NonStop network is uniquely suited to the complete information requirements of multinational, multinational corporations.

Tandem provides local sales and service support in the major computer markets around the world. Including fourteen software education centers in the U.S., Canada and Europe offering professional technical training courses for your programmers and analysts.

Whatever the shape of your system, or the needs of your users, you can be assured that the Tandem NonStop network can satisfy both. And always with the same result: getting the right information to the right people at the right time. No matter where they're located. And without fail.

After all, eliminating the problems caused by information float is exactly what effective communications are all about.

For more information on the Tandem NonStop computer network, contact the sales office nearest you.

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TANDEM

System Targets VAX-11s for Construction Field

LOS ANGELES — "Architectural Computer-Aided Design (Arcad) has announced an Architectural Interac-

tive Design System (Aids) for Digital Equipment Corp. VAX-11 computers that is designed for the design and

construction industry.

Aids uses 32-bit technology. Changes in drawings or other information appear instantly and can be highlighted in color on a graphics terminal, according to a vendor spokesman.

The system reportedly uniformly enforces drafting standards, precision drawing techniques, line weight control, pattern fill and dimensioning capability and coordination of all architectural and engineering disciplines through on-screen overlays. The work of each discipline can also be isolated, the spokesman said.

Other features include production of plots at almost any desired scale; drawing and plotting at all common

architectural and engineering scales; conversion between English and metric measurements; several text styles; and the capacity to produce three-dimensional "walk-around" drawings. The system also includes commands to measure lengths and calculate areas, take inventory of components and total their costs and load information into a relational data base.

A self-teaching program assists the user in becoming conversant with the system within 40 hours, according to a spokesman for the vendor. The product is priced at \$14,000.

Additional information is available from the vendor, located at 445 S. Figueroa St., Los Angeles, Calif. 90071.

Series of Applications Tools Out for IBM System/34, 36

PHOENIX — Computer Guidance Corp. has announced a series of applications packages for construction companies and contractors. The applications are available on the IBM System/34 and System/36.

The system provides analysis and forecasting tools to assist contractors in controlling the variables that affect job costs, a spokesman said. A variety of standard reports are available, and on-line inquiries of current job cost status and financial information are featured. Security can be customized by the user company.

All applications share common files and some standard features. The modules also maintain detail history files that are used to produce reports.

Nine integrated applications are available: accounts payable, accounts

receivable, equipment accounting, general ledger, inventory and purchasing each cost \$3,000. The job cost module is priced at \$4,000, and the payroll and labor cost module is priced at \$5,000. The time and material billing module costs \$2,000. Computer Guidance is located at 2301 E. Shea Blvd., Phoenix, Ariz. 85028.

CIC Package Processes Claims, Uses Pick System

NORTH HOLLYWOOD, Calif. — California Interactive Computing, Inc. (CIC) has announced a new software package for the automated processing of general liability insurance claims. The package runs on a variety of microcomputer, minicomputer and mainframe computers under Pick & Associates, Inc.'s Pick operating system.

Called General Liability Claims Administration System (Genrisk), the package performs all claims processing functions for most types of insured claims involving specified payments for categorized losses, the company claimed.

Genrisk comprises an integrated series of interactive and scheduled-processing program modules that cover all lines of general/casualty liability insurance, a spokesman said. With Genrisk, claims can be processed from their inception to final disposition regardless of the length of time a claims file is required to remain open. The system is transaction-oriented with on-line query, ad hoc reporting and statistical reporting capabilities.

Built-in processing functions include claims validation, verification and adjudication; special damages evaluation; duplicate payment auditing; settlement analysis; and payment by computer-generated checks or vouchers. The program also generates client-specific correspondence and special or state-required forms. It provides comprehensive reserve analysis, including multiple reserves as well as reinsurance control and reporting.

A mainframe or minicomputer version of Genrisk begins at \$35,000 from CIC, located at 12517 Chandler Blvd., North Hollywood, Calif. 91607.

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Micronotes

Oregon Software has introduced Pascal-2, an optimizing Pascal compiler that it claimed is fully integrated into the Unix operating system on the Motorola, Inc. MC68000. Pascal-2 is said to offer the same level of integration with the Unix operating system as the C language.

Programs written in Pascal-2 can call subroutines written in C. Fortran 77 or assembler, allowing the user to take advantage of existing Unix software.

The vendor noted that Pascal-2 compiler performs nine types of code optimization normally performed only by language compilers on large machines.

Compatible with Unix Version 7 and System III, Pascal-2 is available on Unisoft, Inc.'s Unixplan and Microsoft, Inc.'s Xenix versions of Unix for a variety of hardware systems. Pascal-2 for the MC68000 Unix systems will be available in September. License fees for the complete sys-

tem, including the debugger, other tools and a year of software support, is \$1,650. The compiler may be purchased separately for \$600. The vendor is located at 2340 S.W. Canyon Road, Portland, Ore. 97201.

DSI Corp. has announced the availability of its three-dimensional, C-Calc electronic spreadsheet program for Digital Equipment Corp.'s Professional 350. Written in the C language, the software needs no C compiler and features a 600 by 736 cell matrix, on-line help facilities, built-in training, variable-width columns, sorting, report generator and user-defined procedures and functions. The single-license price for the Professional 350 version is \$600. DEC VAX-11 systems running under VMS and Unix operating systems cost \$3,700. DSI Corp. is located at Suite 201, 12620 120th Ave. N.E., Kirkland, Wash. 98033.

Vision Corp. has announced that its Vision open applications system will be available on and fully supported by the recently announced Honeywell, Inc. Series 7900 branch automation system. Vision is priced at \$495, the mouse costs \$230. More information is available from Vision at 2895 Zanker Road, San Jose, Calif. 95134.

Lupfer & Long, Inc. has announced that its Spread financial modeling language is now available on the IBM Personal Computer and XT under Microsoft, Inc.'s MS-DOS. Priced at \$500, the package is available from Lupfer & Long through Box 135, Hanover, N.H. 03755.

Neoteric Systems, Inc. has introduced MSG, a message-send-

ing utility that reportedly stores messages for any designated Digital Equipment Corp. VT100 terminal, and Sysmon, which graphically displays CPU usage. MSG sells for \$200 and Sysmon sells for \$100. More information is available from Neoteric Systems at 520 S. Main St., Bartlett, Ill. 60103.

Market Power Computer Innovations has introduced The Sales Manager, a management information tool for executives in sales, marketing and general business. The menu-drive Sales Manager for the IBM Personal Computer and compatible machines is priced at \$450. Market Power at 11700 Rough & Ready Road, Rough & Ready, Calif. 95975.

ISE, Inc. has announced 16-bit versions of its Screen Master screen I/O manager running under IBM's PC-DOS, Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 86. Screen Master reportedly provides a screen layout capability that defines the positioning of all screen elements, including titles, frames, pictures, menus and windows. Prices for the Screen Master range from \$700 to \$1,200. More information is available from the vendor at Suite 400, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

Control Data Corp. has announced its Plato Microlink software that is said to enable users to have direct access to selected portions of more than 10,000 hours of computer-based education courses, games and electronic communication services for use on the IBM Personal

Computer. Priced at \$50, with a registration fee and \$5/hour for installation, Plato is available from CDC through Box O, Minneapolis, Minn. 55440.

A relational data base management system designed to operate with FI-500 and FI-3000 microcomputers was announced recently by Forward Technology, Inc. The FI-500 and FI-3000 are based on Unix.

The new system includes a screen generator, menu handler, host language interfaces, multiple access methods and standard query language. Utility is available for \$2,000 from Forward Technology, Inc., 2175 Martin Ave., Santa Clara, Calif. 95050.

Micro Solutions, Inc. has introduced software said to make Non-Linear Systems, Inc. Kaypro Division's Kaypro II compatible with 15 other machine formats. Uniform is said to allow Kaypro owners to read, write and format diskettes for other computers running under Digital Research, Inc.'s CP/M operating system. Uniform costs \$49.95 from 125 S. Fourth St., DeKalb, Ill. 60115.

Tarbelle Electronics has improved its Database System for Digital Research, Inc.'s CP/M Plus system. Added functions include multiple field type, multilevel sort, nested IF-ELSE and user-creatable menus. The system costs \$100 from the firm at Suite B, 950 Downer Place, Carson, Calif. 90746.

Monument Computer Service has announced the first of a series of programmer utilities for the IBM Personal Computer. The Power Pac I includes listing, cross reference and disk editing programs. The package costs \$79.95 and requires a 64K-byte Personal Computer and a printer. Monument can be reached through Village Data Center, P.O. Box 603, Joshua Tree, Calif. 92252.

Relational Solutions, Inc. has announced Superstar, said to bring color to Micropro International Corp.'s Wordstar software and to allow users to select default parameters from a menu. The software is available for the IBM Personal Computer, XT or compatible machine using Wordstar 3.2 or a later release. Superstar costs \$29.95 from 8723 Woodleigh Drive, Houston, Texas 77063.

Digital Marketing Corp. has announced Office Piler, an electronic filing system for the IBM Personal Computer. The software runs under Microsoft, Inc.'s MS-DOS 1.00 and 1.10 operating systems. The price is \$995 from the firm at Suite E, 2363 Blvd. Circle, Walnut Creek, Calif. 94595.

Virtual Microsystems has introduced the Z-Chip, a Digital Research, Inc. CP/M co-processor for the Digital Equipment Corp. Professional (at \$495) and all DEC PDP-11/23-based minicomputers (at \$495). The firm is located at Suite 720, 2150 Shattuck Ave., Berkeley, Calif. 94704.

IE Systems, Inc.'s Acculink family of asynchronous micro-mainframe communications

(Continued on Page 66)

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With all the clamor about personal computers, a fundamental fact is often overlooked: some simply *work* better than others.

Consider the COMPAQ Portable.

A computer will make you more productive. A computer will make you more efficient. You hear it everywhere. But you don't hear about which computer actually works best.

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The COMPAQ[®] Portable is a combination of 20th-century electronics and 19th-century pragmatism. It simply does personal computing better. Here's why.

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You don't do all your thinking in one place. Why have a computer that stays in one place?

The COMPAQ Portable has all the capabilities of a large desktop computer. But now those capabilities can go where you go.

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With the COMPAQ Portable, you can be as productive in your hotel room or your lake house as in your own office. It's a reliable companion on a business trip. It's a powerful sales aid in your customer's office.

What's more productive than a computer? A computer that works for you in more places.

Works with the greatest number of programs

The most important consideration when you choose a computer is "what programs will it run?" And that's one more reason for choosing the COMPAQ Portable.

The COMPAQ Portable runs more programs

The COMPAQ Portable was designed to fit under a standard airline seat so you can take it on business trips.



The unique aluminum frame of the COMPAQ Portable has cross-members that strengthen it front-to-back, side-to-side, and top-to-bottom. It's a design practice commonly used in race cars.

than any other portable. In fact, it runs more than most non-portables. That's because it runs all the popular programs written for the IBM[®] Personal Computer. There are hundreds of them. They are available in computer stores all over the country, and they run without any modification, right off the shelf.

Imagine the power of a portable word processor. There are dozens of different word processing programs available for the COMPAQ Portable.

Planning, problem-solving, and "what-ifs" are a cinch with a variety of popular electronic spreadsheet programs. The COMPAQ Portable runs them all.

There are accounting programs for anything from computerizing your family budget to full-scale professional management of payables, receivables, inventory, and payroll for your company.

There are programs for making charts and programs for communicating with other computers. Or if you want something really specialized, there are even program languages for writing your own programs.

So, you get portability and you don't give

up problem-solving power. The combination adds up to the most useful personal computer on the market today.

Works better because it's easy to read

The display screen of the COMPAQ Portable measures nine inches diagonally. It shows a full "page width" of 80 characters on a line so tasks like word processing are easier. And those characters are big enough to read even if you're leaning back in your chair.

The display shows both high-resolution graphics and easy-to-read, upper- and lowercase characters. One screen



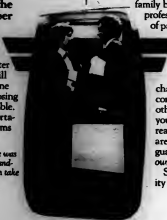
There are hundreds of useful programs for the COMPAQ Portable because it runs all the popular programs written for the IBM.

for all the information. With some personal computers, including the IBM, you can have either the graphics or the legible characters, but you can't have both unless you buy two different displays.

Incidentally, computer prices are often quoted without a display. The display of the COMPAQ Portable is built in, of course.

Add-on options make it work the way you work

Inside the COMPAQ Portable are three open slots. Electronic devices called expansion boards fit those slots and give the COMPAQ Portable new powers.



Just like the programs, expansion boards designed for the IBM work with the COMPAQ Portable, so there are dozens available right now. With them, you can make your personal computer more personal.

Want to check a stock price? Or look up something in The New York Times Information Service? One expansion board enables the COMPAQ Portable to handle those communications over ordinary phone lines.

Want to use your company's central computer files while you're on a trip? There are boards that allow the COMPAQ Portable to communicate with a variety of large mainframe computers.

Other boards let you hook up controllers for computer games or increase memory capacity. Still others let you connect personal computers in a network so several people in your office can share the same information.



Inside the COMPAQ Portable are three slots for optional electronics that can add new capabilities. Most portables have none.

Works better because it's tough enough for the road

Portable doesn't just mean smaller. Portable means tough, too.

The COMPAQ Portable was built to withstand the hard knocks of constant travel. An aluminum frame within the case completely surrounds the computer's working components. Each disk drive is mounted in rubber shock absorbers instead of being bolted directly to the frame.

To test internal components, the COMPAQ Portable was subjected to impacts of 40 G's while running a program. After impacts on each side, there was no internal damage and the program was still running. Without error.

Computers are for getting rid of worries, not giving you new ones.

Designed to help you work better, too

The COMPAQ Portable was designed to feel good.

Specifications

Software

- ☐ Runs all the popular programs written for the IBM PC

Memory

- ☐ 128K bytes RAM
- ☐ Expandable to 640K bytes

Storage

- ☐ One 320K-byte minifloppy disk drive, second drive optional

Display

- ☐ 9-inch (diagonal) monochrome screen
- ☐ 25 lines by 80 characters
- ☐ Upper- and lowercase, high-resolution text characters
- ☐ High-resolution graphics

Expansion board slots

- ☐ Three IBM PC-compatible slots

Interfaces

- ☐ Parallel printer interface
- ☐ RGB color monitor interface
- ☐ Composite video monitor interface
- ☐ TV RF modulator interface
- ☐ Communications interface optional

Physical specifications

- ☐ Totally self-contained and portable
- ☐ 20" W x 8 1/2" H x 16" D

The keyboard is detached so it can fit into your most comfortable working position.

The keyboard cable remains connected at all times. So you don't have to unpack it and hook it up every time you use your computer.

Because the display is built in, the COMPAQ Portable makes a neat,

small package on your desk, instead of a big obstacle you have to talk around. The built-in display also avoids the usual cable clutter because there's no need for separate cables for the display.

The COMPAQ Portable even has an electronically synthesized sound to create the familiar keyclick of a typewriter. With a simple keyboard command you can adjust the volume to suit the level of background noise in your office.

The added usefulness is free

The COMPAQ Portable can do what desktop computers do and do it in more places. But it doesn't cost any more than an ordinary desktop.

In fact, it costs hundreds less than a comparably equipped IBM or Apple® III. The COMPAQ Portable comes standard with one disk drive and 128K bytes of memory, both of which are usually extra-cost options. A second disk drive and additional memory are available to make your COMPAQ Portable even more powerful.

The bottom line is this—you just can't buy a more practical, useful, productive computer. Before you decide on a computer, you owe it to yourself to compare the COMPAQ Portable.

For the location of the Authorized Dealer nearest you, call 1-800-231-9966.

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Microdata
SMV POWERFUL

with Douglas Curry

Micronotes

(Continued from Page 62)
software is now available on Digital Equipment Corp.'s Rainbow 100 computer. The Acculink host group includes support for DEC's VMS, RS/16, RSX-11M, Tops-20 and Tops-10 operating systems. Acculink Micro costs \$245 from IE Systems which can be reached through Box 359, 112 Main St., Newmarket, N.H. 03857.

A support system to be used on the IBM Personal Computer to plan and manage mainframe

based information services has been announced by the System Research Services (SRS) partnership.

The Sys/Plan is designed to allow MIS shops to use the IBM Personal Computer to automate routine planning activities, evaluate planning options and develop realistic and workable plans. Text and color graphics outputs produced by Sys/Plan include application development schedule, net and discounted cash-flow forecasts, budget, return-on-investment and payback analysis and others. A number of plans may be formulated and then impact analyzed against the baseline plan or each other, according to SRS.

The software is implemented under IBM's PC-DOS or Micro-soft Corp.'s MS-DOS and requires two diskette drives and 128K bytes of memory to support planning for more than 50 interdependent applications, and it supports both monochrome and color displays.

The IBM Personal Computer version costs \$4,995. System Research Services is located at Suite 1413, 1800 Old Meadow Road, McLean, Va. 22102.

Micropro International Corp. has announced Version 3.3 of its Wordstar, Mailmerge and Speller packages for the following operating systems: Digital Research, Inc.'s CP/M (2.0 or higher), CP/M 86 and MP/M; IBM PC-DOS 1.0 or 2.0; Micro-soft, Inc.'s MS-DOS and for the Apple Computer, Inc. Apple II, file and III computers. Wordstar enhancements for the IBM Personal Computer include user-selectable colors and function keys and faster screen updating through memory mapping. Enhancements for the Apple IIe and Apple III include user-definable function keys. Wordstar costs \$495.

Mailmerge 3.3 enhancements for 8-bit computers include a conditional print feature that allows the user to print only selected records. Enhancements in Speller 3.3 include a dictionary of 30,000 of the most frequently used American words, and for 8-bit formats, accents, umlauts and other foreign characters. Each package costs \$250.

Micropro also announced Starindex, a program to help organize material in Wordstar documents. Users can create an alphabetized index and a table of contents, format text, create lists of tables and figures, insert blank pages, number paragraphs, sections, appendices and tables, index multiple documents and produce a list of paragraph numbers and pages they are on. Starindex costs \$195.

The Wordstar Professional is a package of Wordstar, Mailmerge, Speller and Starindex for a single price of \$695. Micropro is at 33 San Pablo Ave., San Rafael, Calif. 94903.

USS Enterprises has announced improved software for the Critical Connection, an interface that allows an Atari, Inc. 400 or 800 computer to use disk drives, printer and keyboard of any computer system running Digital Research, Inc.'s CP/M operating system as long as the system has a serial port at 19.2K byte/sec. The package costs \$175 from 6708 Landerwood Lane, San Jose, Calif. 95120.

Micronotes

Graphic Software, Inc. recently introduced **Softplot/Basic Graphics Language** to provide microcomputer users with professional graphics programming capabilities. Available to run on a wide range of microcomputers, it is priced at \$200 by Graphic Software, 1927 Massachusetts Ave., Cambridge, Mass. 02140.

An IBM-compatible software package combining system conversion, program development and disk file management capabilities for personal computers has been introduced by Export Software International of Edinburgh, Scotland. It comprises six modules, ranging from \$250 each in price. Each module can run on the IBM Personal Computer and IBM XT, and the Victor Business Products, Inc. Victor 9000. Operating systems supported include IBM's PC-DOS, Microsoft Corp.'s MSDOS and Digital Research, Inc.'s CP/M 86. The modules will be distributed through Professional Data Systems, Inc., Suite 107, 444 Camino del Rio, San Diego, Calif. 92108.

The Harvard Project Manager, an application package for developing project plans graphically, has been announced by Harvard Software, Inc. Designed to run on IBM and compatible personal computers under the IBM PC-DOS and Microsoft, Inc. MS-DOS operating systems, the package will be available from retail outlets in September at a suggested price of \$395, the vendor said from Harvard, Mass. 01451.

Cycom I, a software communications package for managing electronic mail, file transfer, conversation and dumb terminal emulation; and Cycom 2, designed to convert a microcomputer into a secure encrypted communications terminal, are now available for the Osborne Computer Corp.'s Osborne I. Cycom 1 is available for \$120, Cycom 2 costs \$450. The pair will soon be available for the Apple Computer, Inc. Apple II, Radio Shack TRS-80, and IBM and Digital Equipment Corp. personal computers. Cypher Communications Technology, Inc. is located at Suite 105, 1600 Research Blvd., Rockville, Md. 20850.

A series of interactive, diskette-based, microcomputer training courses for 22 of the principal software programs has been announced by Advanced Systems, Inc. The courses will operate on the 35 largest selling microcomputers and will be priced from \$70 from the vendor at 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

Dasofer, a new program allowing users to transfer files from IBM's PC-DOS 1.0 or 1.1 diskettes to the IBM PC-System, has been announced by Look-Ahead Software, Inc. It requires an IBM Personal Computer with a minimum of two disk drives, 64K bytes of memory, monochrome or color display and the P-System and will retail for \$27.95, the vendor said from 1285 Easter Lane, Eagan, Minn. 55123.

Computer Assist has announced a screen-oriented menu utility, CP/Menu, for Non-Linear Systems, Inc. Kaypro Division portable microcomputers, that reportedly allows users to perform routine system and file operations without having to deal with Digital Research, Inc.'s CP/M operating system. It is available for \$20 from the vendor at Groom Creek Rd., Prescott, Ariz. 86301.

An addition to its series of programmer utilities for the IBM Personal Computer has been announced by Monument Computer Service Power Pac II includes a program to draw shapes on the screen using cursor movements, and two programs to allow drawn shapes to be printed on either letter-quality or dot matrix printers. The package costs \$89.95 and requires a 64K-byte IBM Personal Computer and a printer. Monument Computer Service is located at Village Data Center, P.O. Box 602, Joshua Tree, Calif. 92252.

Pro-Matic, a fourth-generation data base management/programming language, has been announced by RG Software Systems for use in the rapid development of general business applications. It is available for the IBM Personal Computer and IBM XT under Digital Research, Inc.'s CP/M 86, Apple Computer, Inc.'s Apple II+, Apple IIe and Apple "work alike" systems under CP/M, for \$449 from the vendor at 501 Officer Center Drive, Fort Washington, Penn. 19034.

Datatek has introduced its **Datatek word processing system** for the IBM Personal Computer. Compatible with both PC-DOS and Digital Research, Inc.'s CP/M 86 operating systems, **Datatek** lists for \$450 from the vendor at 2621 Enterprise Road, Clearwater, Fla. 33515.

A B Dick Co. has announced software for IBM's protocol **Binary Synchronous Communications** for IBM 3270 and 3740 terminals. The Digital Research, Inc. CP/M-based software is said to allow the vendor's Magna III and Magna-Writer to combine local processing capabilities with access to IBM mainframes. Priced at \$400, the packages are available from the vendor at 5700 W. Touhy Ave., Chicago, Ill. 60648.

Synovation Ltd. has announced, **Printdos**, a print utility for any microcomputer operating under MS-DOS or PC-DOS. For use with most dot matrix printers, the package sells for \$150 from the vendor at 16 Higgins Road, Nepean, Ont. K2G 0R5.

Software Options, Inc. has introduced **Elfi/PC**, an electronic filing system for the IBM Personal Computer. The system reportedly creates standard Basic files with up to 10 search fields per file for selection and sorting. Priced at \$145, the package is available from the vendor through Box 5150, Vallejo, Calif. 94591.

Harvard Associates, Inc. has introduced **PC Logo**, the Logo language for the IBM Personal Computer. PC-Logo is available for \$199.95 from the vendor at 260 Beacon St., Somerville, Mass. 02143.

Infotool Corp. has introduced its **On-time** project management system for task scheduling and cost management on Apple Computer, Inc. Apple II microcomputers. The system reportedly uses critical path techniques for planning, tracking and managing schedules for as many as 250 tasks. Priced at \$275, the system is available from the vendor at Drawer 809, Poughkeepsie, Wash. 98370.

Redding Group, Inc. has released version 2.60 of **Lynx**, its overlay linker for Fortran, Cobol and Basic. Lynx reportedly has the ability to build programs using all available memory, build programs larger than memory with the overlay feature and use commands from disk files. Lynx is priced at \$250 the vendor at 609 Main St., Ridgefield, Conn. 06877.

Pro-Matic, a fourth-generation data base management/programming language, has been announced by RG Software Systems for use in the rapid development of general business applications. It is available for the IBM Personal Computer and IBM XT under Digital Research, Inc.'s CP/M 86, Apple Computer, Inc.'s Apple II+, Apple IIe and Apple "work alike" systems under CP/M, for \$449 from the vendor at 501 Officer Center Drive, Fort Washington, Penn. 19034.

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Looking Behind The Ad Image

Consider the computer advertisement: Gorillas, tigers, gladiators ... businessmen in shirtsleeves tied up or tied down ... marathon runners and musclemen ... supersonic airplanes, flying mailmen and sword-wielding warriors.

Enhanced, faster, more powerful ... expandable, compatible, reliable ... modular and flexible ... user-friendly, all-purpose, congenial ... cost-efficient, low-cost, value-added ... the solution, the answer, the most, the perfect ...

Computer product advertisers search the lexicon for the ideal words to dress up their products. When the right words marry the right visual image, a powerful media mes-

sage results. And the ad sells.

As the computer industry matures, so does the means of marketing. Companies rely more on advertising and less on technological innovation to establish market position. Mini and mainframe vendors selling through a direct sales force often use ads to announce new products or define a corporate image. Manufacturers of office microcomputer systems advertise more aggressively because, above all, they must be distinguishable in a crowded field of look-alikes. Software sellers face a particular challenge: How many ways can you advertise software without picturing a floppy disk?

By Joanne Kelleher

THE AD IMAGE

In Depth/2

IN DEPTH

At one time, microcomputer manufacturers didn't have to worry about whether their marketing strategy was "right." They placed advertisements — actually little more than laundry lists of technical specifications — in the hobbyist publications and then sat back waiting for orders.

That laid-back advertising style predominated before the explosion that catapulted the personal computer industry out of its small, comfortable buyer niche into the unfamiliar

world of the home and office end user... before mass merchandisers started selling systems over the counter... before price wars and software bundling... and before a giant business products company decided to get personal with a little man in baggy pants and a bowler hat.

IBM's arrival in the microcomputer market behind the appealing image of Charlie Chaplin's Little Tramp markedly affected the industry in general and advertising in particular.

To start, the shabby little character reputedly operates on a budget more lavish than anything seen in microcomputer advertising before. Thirteen million dollars is an unconfirmed, but frequently quoted, estimate of IBM's planned television expenditures for Personal Computer advertising in 1983. If correct, that figure sets a new standard for those manufacturers already heavily committed to TV (Apple Computer, Inc., Atari, Inc., Commodore Business Ma-

chines, Inc., Tandy Corp., Texas Instruments, Inc., Times Corp. and others). IBM also signaled to all that the general audience media, whether broadcast or print, could no longer be ignored.

Then there is the image itself — "Everyman," a character "lovable to all kinds of people at all ages," says Tom Mabley, senior vice-president and creative director of IBM's New York agency, Lord, Keller, Federico, Einstein. Surely there is a message in the adoption of such a universal symbol by a company who always leaned toward the business market before. Are the lines between buyer categories blurring in the micro marketplace?

Yes, according to David McGovern, advertising manager for the Personal Computer at IBM's System Products Division in Boca Raton, Fla. "The PC is really a very broad-based product," he says. "It can be used for almost any imaginable application... by business people in offices, by kids at home, by people who write poetry or design tapestries." That universality found its expression first in the name of the product and then in the personality of Chaplin's creation.

"We saw the Little Tramp as a way of adding personality and creating a unique identity for the product without sacrificing the great advantage of a strong IBM association," McGovern says. "But even beyond that, the character communicated exactly what we wanted to say about the approachability of the product. If the Little Tramp can use it, anyone can."

It also didn't hurt a bit that Chaplin used the role to slap at technology in the film "Modern Times." While some say the use of that title as part of the campaign tag line constitutes an ironic oversight, McGovern quickly dismisses the idea that any aspect of the image was left unexamined.

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'An ad agency comparison of the Chaplin character on television and real people in print convinced everyone that the little man should carry the Personal Computer banner single-handedly.'

"We knew the film was antitechnology when we selected the character," he says. "What we decided was that it was something that could work to our advantage. After all, by showing that the product is something even the Little Tramp could embrace, what we're doing is getting across the idea that this machine is just the opposite of the bad technology the real Charlie disliked."

The Little Tramp first came under discussion halfway through the planning for a 60-second TV commercial that would officially launch the Personal Computer.

"We had defined our needs very clearly," says McGovern. "When you come right down to it, marketing is really a very logical process, not unlike writing a program."

What remained to be filled in was the form to fit the specifications. The

commercial needed to start with a visualization of computers as they once were — imposing white objects housed in a sterile, colorless environment. Then would come the transformation of the computer that the IBM Personal Computer represented — shrinking the monolith down to human scale. The Lord, Geller creative team considered using an on-camera celebrity (already been done) and a mime (Marcel Marceau?) before hitting upon Charlie Chaplin.

According to some recollections, the black suit clinched the part for the Little Tramp. All that white background begged for contrast. Later, the black-white scene demanded a bit of color, and so appeared that much-imitated signature item — the single red rose.

Initially, Lord, Geller regarded Charlie strictly as a television per-



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former. The print campaign relied on a different image — real people. But an ad agency comparison of the Chaplin character on television and the real people in print convinced everyone that the little man should carry the Personal Computer banner single-handedly.

Charlie proved versatile, adapting from general information ads such as a two-page spread showing the Little Tramp in the operator's seat under the headline, "How to test drive the IBM Personal Computer" to 1/2-page applications software treatments. The company felt no hesitation at all about expanding his duties to include introducing the XT, a hard

disk-based version of the Personal Computer.

Do even the most effective of images — such as Charlie — still have a definite life span?

"Perhaps," hedges McGovern. "This is a fast-moving industry. But I'm inclined to agree with David Ogilvy, who said that if you find a good advertising theme, you ought to stick with it because as it matures, it just keeps working harder and harder. Besides, I think Charlie's got a lot of life in him yet."

Shifting Focus at Apple

Dick Cavett, on the other hand, rests in semiretirement at Apple. (Continued on In Depth/6)

BRYCE'S LAWS ON INFORMATION SYSTEMS

"If an Information Requirement is incorrectly stated to begin with, then everything else that follows will be incorrect."

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IN DEPTH

Treading on Risky Ground?

Doug Wood scans computer ads and wonders when the lightning is going to strike. "I suspect that something will break soon," he says, "because the whole area is ripe for some kind of action."

Wood, a specialist in advertising law and an associate in the New York

law firm of Hall, Dickler, Kent; Howley, isn't sure whether the first strike will come in the form of regulation precipitated by consumer complaints or a major legal battle between advertisers under Section 43-A of the Lanham Act. Section 43-A is a very popular clause with companies that

feel they have been subjected to unfair comparisons in their competitors' advertising (Coke and Pepsi met in court when Coca Cola invoked the Lanham Act). But Wood is certain there are plenty of grounds for either type of action in computer equipment advertisements.

"You really have to look between the lines to find out what you are getting," he says, observing that while this is wise purchasing behavior, it is not mandatory. The law operates on the basis of net impression and does not regard either skepticism or sophistication as necessary consumer attributes.

Advertisers are treading on risky ground, according to Wood, when they talk about hardware that can be used to perform specific tasks but do not tell readers that the software necessary to do those jobs must be purchased separately. Price-directed comparisons that fail to make clear substantive differences in features like memory often venture over the fine line of deception.

"I don't say there is intention on the part of these marketers to deceive the public," Wood says. "The problem is that the technology has become so similar that, essentially, everyone is trying to find a way to differentiate products that are pretty much the same — soap is soap, bleach is bleach and a computer is a computer." If advertisers decide to take off an attachment or a piece of software and drop the price... or make use of a few superlatives in discussing ease of use in order to make their product seem more distinctive, their actions may be understandable but still not defensible.

Part of the problem, Wood observes, is the rapid growth of the industry. So much is happening so quickly that regulation hasn't kept pace. "Who would have thought, a year ago, that most people would be able to buy a home computer?"

Television, an industry that is governed by a rigid set of self-imposed codes on advertising, has managed far better than print media to keep computer advertisers honest, although Wood worries that even in this area there may soon be some fallout from an emerging genre of commercial messages: emotional appeals designed to provoke insecurity and guilt.

"The toy industry tried that a few years ago and it really backfired," says Wood. "They wound up having to operate under all sorts of regulations."

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No other microcomputer offers the degree of software integration afforded by the Gavilan shared data format of CapsuleWare.

The complete set of CapsuleWare programs includes CapsuleWord™ word processing, CapsuleCalc™ calculation & analysis, CapsuleOffice™ portable secretary, CapsuleComm™ communications and CapsuleForm™ forms processing.

Secondly, the Gavilan's primary user interface is not the keyboard, but instead, a built-in pressure-sensitive touch panel that not only selects, but executes, commands. With the full capabilities of a mouse, this simple "point

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agents to industrial engineers, architects to anthropologists.

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IN DEPTH

(Continued from In Depth/3) Computer after serving as broadcast spokesman for about a year and a half. "We still have him under contract," says Henry Whitfield, Apple's advertising manager.

er. "But this year we decided to use him for voice-overs instead of on-camera appearances and for some other types of promotions such as co-op radio commercials and in-store video displays."

The shift does not imply corporate judgment that Cavett's personal appeal was fading. "In fact," says Whitfield, "we get a lot of play-back from his commercials whenever we do awareness

studies." Apple is simply pursuing its strategy of focusing advertising slightly ahead of the fast-moving market. In 1981, that meant jumping into broadcast with a personality — Cavett —

that could command a broad audience and help the company to build a strong brand awareness before demand and competition exploded.

"What we needed at the time," Whitfield explains, "was a vehicle for reaching the unwashed masses, someone who would communicate the idea that we are a friendly and approachable company. The object, as we went down the list of possibilities, was to find a person who was known for wit and charm and personality but definitely not for a technical or hobbyist image."

This year, the emphasis changed to multiplicity of applications and the company's leadership position. Print ads, where Cavett never appeared anyway because Apple believes that a celebrity does not project off a page, mixed case histories with some innovative variations on a Book of Lists presentation technique. For one of the latter, Apple went to a third-party compiler of software information to obtain a comprehensive rundown of all existing packages designed to operate on its equipment and then produced an ad listing 1,000 packages.

A later adaptation, which appeared in upscale magazines just before the Christmas holidays and eventually found its way onto a poster, drew on the application stories that users had sent in over the years to offer a collection of 100 practical anecdotes.

The general theme of this stage, "More people in more places are doing more things with Apple," reflected an awareness of IBM's rapid approach.

"We figured that we'd better hone out our position of superiority while we could still say that we had a bigger software base and were distributed in more places than anyone else," Whitfield explains.

Apple and its advertising agency, Chiat-Day in San Francisco, are currently fleshing out a new campaign. At this stage, it is easier to say what Apple will not do than what it will. Price advertising is not likely to find any place in the company's marketing strategy. "We don't feel that price really belongs in national advertising," says Whitfield. "People don't really have a feel for price in terms of performance, and it is confusing."



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CW COMMUNICATIONS, INC.

THE AD IMAGE

IN DEPTH

Besides, we believe that price decisions get made further along in the process."

The current plant toward applications may very well be de-emphasized in the next round of advertising, in light of Whitfield's observation that "the applications thing is starting to be overdone." And, even though Apple is avowedly interested in claiming its fair share of the upper-level business market, it is extremely unlikely that the company will attempt to do so by positioning itself directly against IBM.

"We look at this as a two-horse race, with us and IBM as co-leaders," Whitfield says. "We know there is a certain psychographic group that will always buy IBM because IBM equals 'safe,' and there's not much of any way to turn that kind of an attitude around. On the other hand, there are a lot of middle managers as well as MIS directors out there who are more in tune with Apple's philosophy. These are the people we have to segment our appeals to reach."

In any case, he adds, resorting to tactics like comparison advertising would undercut the very image that Apple works so hard to cultivate. "We are a leader, and a leader plays the ball game differently from the followers."

Ad Takeoffs

Between the two of them, IBM and Apple spawn enough associative images and comparative campaigns to fill a good-size trade book. Apple has been bitten to the core, eaten "for breakfast" and plucked in a number of ways. IBM, having wisely chosen a privately held image to which it could obtain exclusive rights of use, does not have to stand by and watch a legion of Little Tramps being subjected to verbal or visual abuse.

Canes, bowlers and long-stemmed American Beauties are enjoying tremendous vogue right now, particularly among peripheral manufacturers, and one mustachioed chief executive even went so far as to pose himself with all three in an advertisement for his company's analog I/O system for the IBM Personal

'Between the two of them, IBM and Apple spawn enough associative images and comparative campaigns to fill a good-size trade book. Apple has been bitten to the core, eaten "for breakfast" and plucked in a number of ways.'

Computer. But when a portable computer vendor went one step further and made a Chaplin facsimile the

butt of comparison, it was politely but firmly asked to desist by the Chaplin family.

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Best of all, System 1032 is fast and pretty. If answers complex queries almost instantly and produces presentation-quality reports with single commands.

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If you're a manager, you'll especially appreciate System 1032. Your users and programmers all use the same unified command language and data base concepts, so communication between them is easier than ever. And System 1032's careful human engineering drastically cuts your training costs and increases productivity.

Plus we exploit the best of the VAX architecture with shareable native code, asynchronous I/O, and propri-

etary inverted files—efficiently! So really... not any more, according to Robert Katzive, vice-president of the computer division at Genesis Concepts, a market research and consulting firm in Menlo Park, Calif. "It was clever the first 333 times it was done," he says.

Two campaigns that have managed to attract a great deal of favorable attention by putting a different spin on the comparison tactic belong to Commodore and Burroughs Corp.

Are such takeoffs effective? Not really... not any more, according to Robert Katzive, vice-president of the computer division at Genesis Concepts, a market research and consulting firm in Menlo Park, Calif. "It was clever the first 333 times it was done," he says.

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Software House has an impeccable decade-long reputation for reliable support and responsive technical support. System 1032 is the off-spring of System 1022, "the most widely used DBMS for DEC mainframes. Its step-oriented commands and relational design have proved themselves in years of use at hundreds of sites. And System 1032 has undergone extensive field-testing to ensure that it works right the first time for you. Although new, System 1032 is already the most mature DBMS available for your VAX.

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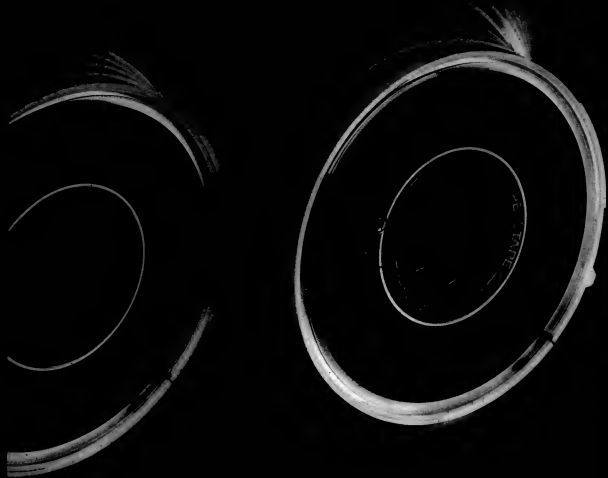
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Journal of Management Education 32(10)

1

IN DEPTH

Commodore perked up what could have been a ho-hum memory-for-price comparison against IBM and Apple by arranging to have the machines in question deliver the verdicts, which were, not

surprisingly, very favorable to Commodore. "A brilliant piece," says Tricia Parks of Future Computing. "One of the most carefully worded comparisons I've seen," says Doug Wood, an attorney

with the New York law firm of Hall, Dickler, Kent, Howley, which specializes in advertising law.

"Well, we've always believed it is a smart approach to compare your position to

that of leaders who have a much more established brand image," says Myrddin Jones, vice-president of marketing for Commodore. The basis used to define comparative value was, he confirms,

very carefully selected. "What we were doing was comparing memory for cost, and the measure we used was the suggested retail price, since that provided a published base that was unarguably equitable. If anything, I'd say we may have erred on the conservative side."

Television is a familiar medium for Commodore. The company devotes 75% to 80% of its advertising budget to network and spot commercials targeted at an audience of adults between the ages of 18 and 49.

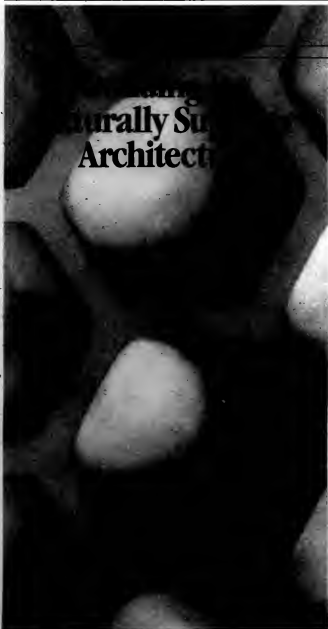
The money is spread across two distinct campaigns, the "value-against-the-leaders" effort mentioned above and what Jones refers to as "essentially a computer literacy series." The latter stresses the theme, "You can't really afford to be without one." It is perhaps identified in most people's memories with a single image—a pop-eyed young man (Zero Mostel's son) staring avidly into a goldfish bowl while furiously manipulating a joystick.

Image Effort

Burroughs, by contrast, is a less seasoned and more restrained user of television. Its campaign comparing the Burroughs B20 small business computer with the IBM Datamaster is really as much an image effort as a product sell, according to Chuck Ragains, director of advertising and marketing. The comparison's objective is not actually head-to-head combat but rather a positioning of the company and the product against a corporate entity perceived to be the standard of excellence.

Burroughs suffered from lack of visibility, says Arthur Selkowitz, president of Penchina & Selkowitz, the New York agency that devised the B20 campaign. Among the people who knew its products, the company enjoyed an excellent reputation, he says, but to the public at large, Burroughs remained an undifferentiated member of "the Seven Sisters."

The proposed solution—identify yourself with the front-runner—was not a particularly new idea. The fresh angle came in the method of message delivery: out of the mouths of two former IBM employees now highly placed executives at Burroughs. Two black-and-white print ads bear the



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1. BUSINESS/INDUSTRY (Circle one)

- Plus Users
- 10 Manufacturer (other than computer)
 - 20 Financial/Insurance/Broker/Dealer
 - 30 Medical/Law/Education
 - 40 Wholesale/Retail Trade
 - 50 Business Service (except DP)
 - 60 Government/State/Local
 - 70 Public Utility/Communication Systems/Transportation
 - 80 Financing/Construction/Personnel/Training
 - 90 Other _____

Vendors

- 10 Manufacturer of Computers, Computer-related Systems or Peripherals
- 20 Computer Software/Software Planning/Consulting
- 30 Computer/Peripheral Dealer/Distributor/Vendor
- 40 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle one)

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 14 Director/Manager/Supervisor C/MIS Services
- 22 Director/Manager of Operations/Planning/Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 C/MIS Director/Manager/Supervisor
- 38 Data Comm Network Systems Mgmt
- 41 Eng/Scientific/RS&D/Tech Mgmt
- 51 Mkt Sales Rep/Sales/Marketing Mgmt
- 60 Consulting Agency
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Writer/Student
- 90 Other _____

3. COMPUTER INVOLVEMENT (Circle all that apply)

- Types of equipment with which you are personally involved either as user, vendor or consultant:
- A. Mainframe/Supervisors
 - B. Microcomputers/Personal Computers
 - C. Microcomputers/Peripherals
 - D. Microcomputers/Software
 - E. Office Automation Systems

THE AD IMAGE IN DEPTH

In Depth/12



headlines "A Man Who Worked 14 Years at IBM Raves About the Burroughs 320" and "A Testimonial for the Burroughs 320 From Someone Who Spent 17 Years at IBM." Pictured are company spokesmen Carl H. Janzen, president of the Business Machine Group, and Dr. W. Lee Shevle, senior vice-president of corporate operations.

Saying anything about computers in black and white is a relative rarity these days, but, as Seltowitz explains, the decision was a matter of both budget and philosophy. Television time is not cheap, and even though Burroughs' advertising allotment runs into several million dollars, the unaccustomed expense of

national broadcast time requires some stretching. But equally important, says Seltowitz, "Our agency has a belief that color should not substitute for an idea. It certainly makes it easier on an agency if it can count on color to help out, but that isn't what good advertising is about."

Classic black and white may not catch on as a trend, but the Burroughs story is typical of a number of other movements within the computer industry.

The decision to approach a broader audience is becoming more common at all levels of the field.

Parks at Future Computing suggests, for example, that the proliferation of computer advertising in air-

line magazines provides an indication of a trend toward mainstream marketing. "I find them a good information gauge," she says, "and over the past two years, there has been a significant increase in the number of computer ads appearing in these books."

In fact, Hank Thunhorst, advertising director for American Way magazine, the in-flight publication of American Airlines, unhesitatingly names computer advertising as "by far our strongest category." Currently, Thunhorst projects an annual total of 250 to 300 pages for 1983, an increase of almost 90% compared with 1982.

More important than any shifts in placement, however, is the change in attitude that this broadening of media selection implies. Computer advertisers, whether their products are hardware, software or peripherals, have begun to understand that their audience is changing. As Parks puts it, "The market no longer belongs to the techies."

It is not easy for vendors to stop thinking in terms of technical features and start thinking in terms of user benefits and packaged-goods marketing for the mass audience.

Companies are beginning to do it, however. Burroughs, for example, picked an agency with a combination of strong business and packaged-goods experience in the backgrounds of its principals: Responsibility for advertising and marketing at Burroughs belongs to Chuck Ragains, who freely confesses ignorance about the technical niceties of the company's equipment.

"Until 1982, the industry was 'locked into a product-driven mindset,'" says Chris Yalonis, project director of the Software Group at Creative Strategies, International, a market research firm in San Jose, Calif. "A lot of the marketing was being handled by neophytes, technical people who had come from the mainframe environment."

In the last couple of years, that situation has changed significantly, however. Leading software companies, like their hardware counterparts, have begun to bring in marketing talent from the packaged-goods environment, and budgets for advertising and public relations have increased appreciably, claiming as much as 8% to 12% of revenues in the top tier.

Wide Range in Quality

What companies choose to communicate with the money they are spending, the appropriateness of the images and the messages being sent, is still extremely variable.

"Generally, I would say that the quality of advertising varies as widely as the level of sophistication in products," says Erica Parks.

Gnostic Concepts' Katzev is less diplomatic. "Most of it is still dreadful," he says. "The emphasis is still too often on features, rather than

benefits, and what material there is that does talk about benefits frequently handles it in a condescending way. There's a lot of talk about productivity, for example, but the ads almost always fail to get down to exactly how the product can improve an operation."

But Katzev concedes he has seen some effective advertising — some good cartoons, for instance. "A little whimsy isn't a bad idea, particularly" (Continued on In Depth/14).

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CICS/VS Application Design	Aug. 29-Sept. 2	NY
	Aug. 15-18	NY
	Oct. 3-6	NY
	Oct. 24-27	LA
CICS/VS Command Level Debugging	Aug. 10-11	NY
CICS/VS Recovery/Restart	Sept. 26-30	NY
CICS/VS System Problem Debugging	Sept. 20-21	NY
CICS/VS Audit and Controls	Oct. 17-19	NY
CICS/VSOL1 Interface Architecture	Aug. 31	NY
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The Advertiser's Responsibility

David McGovern — IBM: "We try to be sensitive about the impressions we convey in our advertising. But when we are making television commercials, especially ones using Charlie, we don't expect that people are going to project themselves into the situation; we expect them to understand that we're not trying to be realistic. It is hard to explain anything in great detail on TV, which is why we augment TV with print advertising."

Marvin Goldschmidt — Lotus Development Corp.: "You certainly don't want to oversell your product or mislead people about what it will do for them. I do think that certain assumptions have to be granted... There is going to be a learning curve associated with any product. We try to make sure there is no misunderstanding on that point by talking about the tutorials in our advertising. I suspect there will always be a certain percentage of purchasers for any product who are misled in their impressions about the product, but when it happens, I think it is usually inadvertent rather than a conscious intent on the part of the advertiser."

"In the end, performance in the marketplace is the best test of how close you come with the advertising. If the advertising is misleading, people will just stop buying. I remember, that when I was a child, there was a drink being advertised very heavily and I badgered my parents until they bought some. I took one sip and that was it. We never bought it again."

Mark Corona — Open Systems, Inc.: "Ours is a multiuser product [the Software Fitness Program]. That's something you could get into a lot of trouble saying, unless it is really true. We are very careful to explain that and everything else we say

about the product in our advertising with detailed promotional literature. We work through distributors, so it is important that both they and the consumer understand exactly what is being sold. We want to make sure no one is surprised anywhere along the line. One thing we don't do is an-

nounce products that haven't been produced. We don't believe in talking about things that don't exist."

Maura Smith — Softtek Microsystems: "We have an in-house attorney who takes a look at all our advertising and promotions before they go out the door. We try very hard to po-

sition ourselves clearly and to establish a level of expectation we can meet, but it is difficult to deal effectively with the real technical benefits in the space of an ad. That's why we did three separate ads for our operating system [the UCSD P-System], one to highlight each major benefit."



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THE AD IMAGE IN DEPTH

In Depth/14

(Continued from In Depth/12)
if you are a start-up."

That was the thinking at Lotus Development Corp. when the company launched 1-2-3, its integrated spreadsheet, information manage-

ment and graphing program. "We took a fairly laid-back approach in the original campaign," says Marvin Goldschmitt, vice-president of business development. The use of humor and a

loose, cartoon-style illustration seemed appropriate for much the same reason: the product was given its name, "as opposed to something like Technovision," says Goldschmitt. "We intended

to address a wider audience than most software companies had tried to reach in the past. We wanted to move toward a more consumer orientation, which is something the industry has paid lip ser-

vise to but very seldom actually done."

Images for Software

Software companies face particular difficulties establishing visual identity. Unlike hardware or peripheral manufacturers, they produce no gears or gizmos to fall back on in a pinch. For companies operating in a market as crowded as software, the problem is compounded. Everything, not only products, but also the distributors, looks alike, it sounds alike.

"There were just too many business accounting systems out there and they all had about the same name, which creates problems not only for the people buying the package but also for the distributor," says Mark Corona, national sales manager for Open Systems, Inc. in Minneapolis. In 1979, the company changed the name of its product and its advertising image to emphasize fitness rather than finance.

Three full-page ads, placed in rotation, use realistically drawn illustrations of athletes — a runner, a hurdler and a generic champion — to personify the software system, now called the Software Fitness Program.

"We want to create a unique image, something that says more about the product than the stack of papers that usually comes to mind when you think about visual illustrations of finance and accounting functions," Corona explains.

Fitness was already something of a national obsession in 1979, and Open Systems didn't think it would be stretching too far to equate physical with financial well-being.

"When you think of someone who is physically fit, you think of someone who has a healthy outlook... someone who is able to tackle whatever situation may come up," says Corona.

This tactic, appealing to the potential buyer's desire to see himself as someone out of the ordinary, can be very effective, notes Kitzvitz, pointing in particular to the name and image chosen by Eagle Computer. "There's nothing wrong with that association," he says. "It says things like Bold, Courageous, Adventurous and American. And those are qualities that the average reader would like to identify with. The auto industry has been using this line of reasoning for years."

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BEST/1-MVS™ Capacity Planning/Performance Modeling Tool. Evaluates impact of workload growth, hardware configuration modifications and consolidations and changes in MVS parameters. Provides extensive "what if" capabilities.

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THE AD IMAGE

IN DEPTH

Norman Rockwell connotes Americanism and Good Old Days, depending upon the ad his style is gracing. Softech Microsystems, Inc. of San Diego uses the painter's look, although not his medium, to create the image of an entrepreneurial (read rugged individualist) environment in ads directed toward software developers. The smiling worker obviously feels good working with the UCSD P-System, a product that fits right into the controlled messiness of his office.

For Anadex, Inc. of Chatsworth, Calif., on the other hand, one of the most important messages to be communicated about its Silent Scribe printers is point of origin.

"The main reason we wanted to use a style that looked like Rockwell was because he seems like a particularly American artist and our products are all made in this country. What we're saying is, 'Buy American,'" explains Ken Mathews, director of marketing.

Making Learning Fun

The animal trademarks of Leading Edge Products, Inc. aim to embody the admirable qualities of the product they represent.

"Our elephant and gorilla symbols are both coming from the same place," says Bill Sellers, vice-president of marketing research for the Canton, Mass., peripherals company. "We believe there is a trend in the computer industry to make learning fun."

It would be a serious mistake, however, to assume that because the company and its agency (Welch Currier Smith of Boston) know the value of a light touch and teaser ads, the animal identifications are kept around just for fun.

"Think about it," says Sellers. "What does an elephant not do? Isn't that what you want your diskettes not to do? And the gorilla... he says a lot, too. The Gorilla name covers a product group that includes printers, monitors and other peripherals for the home marketplace and his line is 'Guaranteed Tough.' " The monacle on the gorilla? Well, that's to give him an intelligent air.

"Anyone who tries to catch your eye with a 'borrowed-attention' device does not understand the potential or inherent drama of his own

product," says Bob Rehak, vice-president-creative director of Tracy-Locke/BBDO. "Advertisers resort to these when they don't have anything meaningful to say about the product."

Rehak believes that ads reflect the company that pays for them. "Advertising agencies create ads," he says. "Advertisers approve them. It's a collaborative process. While the finished ad is largely the

work of hired guns, it tells you a lot about who approved it. The more professional a client is, the higher the standards he sets in his advertising. The more disorganized a client is, the

schlockier his ads look."

Rehak advises buyers to view purchasing computer-related products as establishing a partnership with the vendor company. "Their nameplate will be on display

We just gave the computer industry something to reach for.
A new standard...
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G O U L D



GOULD

IN DEPTH

in your offices," he says. "How will it affect the way customers perceive you? How will it affect the way your employees perceive you or themselves?"

Advertising can give clues as to what type of people run the vendor company. At the very least, ads reflect how the company wants to be considered in the minds of potential customers. According to Rehak, image becomes more important as computer-related products become more

'Advertising can give clues as to what type of people run the vendor company. At the very least, ads reflect how the company wants to be considered in the minds of potential customers.'

complex. Buyers must put more trust in the people who make, service and upgrade what they purchase.

In Rehak's study of computer advertising, IBM stands out. "These are not just great computer ads, they are

great ads," he says. The objects of his praise are:

- The full-page fingerprint, with accompanying text on uniqueness in the business world. Rehak says, "Someone had the panache to show a fingerprint rather than a dozen pieces of hardware."

- The rows of fair-weather clouds with just one raining, "a corporate image ad in which IBM admits that it, too, is human."

- The organizational chart full of boxes praising System/38, an ad which recognizes that "harmony is a better selling tool than the obligatory hardware shot."

Rehak believes IBM's approach succeeds because of its simplicity. "The ads aren't burdened with details you'll find on the spec sheet," he says. "And they aren't cluttered with hardware you'll see in the catalog. They spend their time selling IBM as a company that's smart and in touch. They build image equity. When the current hardware becomes obsolete, these ads will still be working hard, making friends for IBM."

Creating a distinct and memorable image is much more a consideration in the micro marketplace than the mind or mainframe sectors.

"Image," Rehak says, "plays an important role in the purchase of computers and office systems. Of course, hardware comes first. But when it finally comes time to buy, once you have defined your needs and narrowed your shopping list to the candidates that can do the job for the money, the image of a company will often be the tie breaker."

About the Author

Joanne Kelleher is a Boston-based writer who specializes in business and information technology. A former editor of *Ad East*, a publication covering the advertising industry, she frequently contributes marketing-related articles to national business publications.

YOUR KEY TO COMMUNICATION NETWORK COMPATIBILITY.



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- Together these features add up to the most flexible protocol gateway available to the multi-vendor systems into a cohesive, cost-effective network.

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Communications Mart Continues Surge

FRAMINGHAM, Mass. — The total value of data communications equipment shipped worldwide by U.S. manufacturers will grow to more than \$5 billion by 1987, according to a newly released study by International Data Corp. (IDC) here.

The study, *Data Communications Equipment Market*, estimated the 1982 data communications equipment market at more than \$1 billion and predicted its average annual growth rate to be 21.4% over the next five years.

Calling it "one of the most dynamic markets in the information processing industry," IDC said that the combination of large-scale integration and microprocessor-based technology has made the equipment less expensive to manufacture and purchase.

The study discounted the highly touted all-digital networks of the future, which require less data communications equipment, saying that the growth of other networks will contribute to the large growth.

Leading the overall data communications industry is IBM, followed by Codex Corp. and Rascal-Milgo, Inc., the study said. IBM shipped \$346.5 million in data communications equipment worldwide last year, most of which was communications processors. Codex shipped \$178.5 million and Rascal-Milgo shipped \$135.2 million, 572 million of which is estimated to have come from shipments of 9,600 bit/sec modems.

Modem shipments were estimated for 1982 to have been \$842.2 million and are expected to grow about 15% to more than \$1.7 billion in 1987. Worldwide shipments of multiplexers totaled \$279 million in 1982, with 1987 shipments expected to skyrocket to \$1.2 billion, the study said.

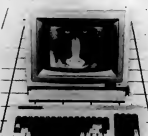
Graphics/APL Unit Announced

MISSISSAUGA, Ont. — Nelma Data Corp. (NDC), has announced the NDC 300G, a graphics/APL terminal capable of displaying two graphics modes and a variety of text modes.

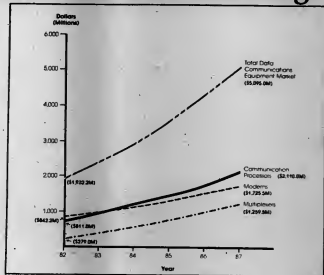
The unit is capable of displaying 512 by 240 dot resolution graphics with a scrollable split-screen window and graphics input with cross-hair cursor. The unit supports a Tektronix, Inc. 4010 protocol, the vendor said.

A monochrome graphics mode for image processing applications can also be displayed with a 256 by 240 dot resolution, the vendor said.

Text modes include a standard 128-char. Ascii set and a 128-char. APL character set. The unit costs \$1,355. Nelma Data Corp., 5170A Timberlea Blvd., Mississauga, Ont., Canada L4W 2S5.



Nelma 300G Graphics Terminal



Total Dollar Value of Worldwide Shipments 1982-1987

"Codex continues to be the leading supplier of multiplexers, with an estimated \$56 million coming from high-end statistical multiplexer shipments," the study said. Other leaders in the statistical multiplexer marketplace were said to be Time-

plex, Inc.; Micom Systems, Inc.; Infotron Systems Corp.; and General Datacomm Industries, Inc.

The study is available to nonsubscribers for \$3,500 from IDC, Five Speen St., Framingham, Mass. 01701.

3M Unveils Portable Terminal For Whisper Messaging System

ST. PAUL, Minn. — A portable, electronic terminal designed for its Whisper Exchange electronic messaging system and other electronic mail systems has been introduced by 3M Corp.'s Business Communication Products Division.

The Whisper Reader Communications Terminal weighs less than 2 lbs., measures approximately 10 by 5 by 2 inches and is fully battery-operated, according to 3M.

The company said that no auxiliary power source is required to send or receive information in print via a standard telephone receiver; a built-in modem provides transmission through direct connect to RJ-11 telephone jacks or via optional acoustic couplers.

A full Ascii keyboard includes a 16-message user information panel and built-in Help messages to assist users, 3M said. Messages are displayed on a 40-char., 5 by 10 dot matrix liquid-crystal viewing line; an optional RS-232 Printer Interface Module is available for hard-copy printouts, the company said.



3M's Whisper Reader Terminal

When not transmitting, 3M said, the terminal functions as a text editing unit with 16K-byte memory and 20 separate memory files to hold messages for later transmission.

The terminal is priced at \$745. 3M Business Communication Products Division, can be reached through Department BK3-10, P.O. Box 33600, St. Paul, Minn. 55133.

Receive-Only Modem Debuts

REDMOND, Wash. — A receive-only modem designed for reception of computer data from commercial radio stations has been introduced by Microperipheral Corp.

The new device is compatible with 300 bit/sec Bell Laboratories 103 signals, the company said, but will operate up to 4,800 bit/sec using a method of generation and recovery. This reportedly permits downloading a complete video game in approximately four seconds.

Microperipheral anticipates the licensing of radio stations and cable operations around the country to permit downloading of programs by main FM audio channel, not subcarrier, during specified periods. Users will reportedly be able to record the station's signal.

The retail price of the new device is \$69.88, and further information is available from Microperipheral at 2565 152nd Ave. N.E., Redmond, Wash. 98052.

COMMUNICATIONS

CDI Enhances Video Display Line

ADDISON, Ill. — Two monochrome monitors have been added to the video display line of Computer Displays International, Inc. (CDI).

Designated as 1200-Series and 1500-Series, the units have 12-in. and 15-in. screens, respectively. CDI said image resolution has been improved by increasing horizontal scanning frequencies to 32kHz and video band widths to 32MHz.

The displays can be supplied with any registered phosphor, according to CDI. Each is available with switching power supplies for terminal and monitor logic. A digital brightness control feature is adjusted from the operator's keyboard, CDI said.

The single-unit prices of the new displays are \$225 for the 1200-Series

and \$245 for the 1500-Series. More information is available

from CDI at 859 S. Rt. 53, Addison, Ill. 60101.

Polaroid Introduces Antiglare Screen Filters

CAMBRIDGE, Mass. — Antiglare, contrast-enhancing screen filters were recently introduced here by Polaroid Corp.

The Polaroid CP-70 Contrast Enhancement Filter is available in 21 sizes to fit most word processor and computer terminal screens, the company said. Each filter has a self-adhesive mount to attach to the screen; no

tool or assistance is required to install, remove or clean the screen, according to Polaroid.

The CP-70's circular polarizer reportedly absorbs ambient light falling on the screen and prevents it from bouncing into the user's eyes.

Prices start at \$98, Polaroid said from 575 Technology Square, Cambridge, Mass. 02139.

Data Logger With Displays Announced

NEW BRIGHTON, Minn. — A programmable data logger with CRT display and print out recording has been announced by J & W Instruments, Inc.

The Digi/Scan 10C provides single- or multiple-channel displays with alphanumeric display for single-channel use, the company said.

Single-channel display reportedly shows process value, input type, engineering units, alarm values and status, print interval and channel number, time and date.

Programming follows sequential instructions displayed on a 7-in. CRT for input types, engineering units, range scan, alarm values and print intervals, according to the company.

There are no factory-set limits, and the user sets all programs, the vendor said.

The new device is available for approximately \$5,000.

More information is available from J & W Instruments, 4800 Mustang Circle, New Brighton, Minn. 55112.

Why Do MIS Directors and Users Love Their New Davox Terminals?



MIS Directors Love Us For Our Compatibility.

All Davox models combine true 3270 emulation (BiSync and SNA/SOLC) with ANSI-compatible Async and screen printing.

Simple software configuration quickly adapts each terminal to new computer systems, with no hardware changes.

And Davox's unique approach to eliminating coaxial cable is the most flexible and cost-effective in the business.

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New users find Davox terminals very friendly to use, reducing the time

needed to learn new functions.

With the touch of a single Smart Button*, users can instantly perform complete data or voice tasks—3270, ASCII, personal computing, or phone—tasks that

normally require many manual steps. The optional integrated featurephone system is both powerful and comfortable to use. Numbers can be dialed automatically from the terminal's Personal

Directory, or from a large directory maintained on a host computer—ideal for telemarketing applications.

And Everyone Loves Us For Our IBM* Personal Computer Attachability.

Davox terminals are the first designed to connect directly to any IBM Personal Computer, providing instant access to off-the-shelf PC programs.

The touch of a single Smart Button instantly adds the power of personal computing to the terminal, either as a dedicated PC or as one shared by other users.

Let us show you why everyone loves their new Davox terminals. For more details, call us at: (603) 424-4500. Davox Communications Corp. 6 Continental Blvd. Merrimack, NH 03054

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*IBM is a registered trademark of International Business Machines Corp.

Internal Modem Out for Kaypros

WICHITA, Kan. — Datastyles (DS) has introduced its DS 300/AD direct-connect modem for Non-Line Systems, Inc.'s Kaypro computers.

Created for maintaining the portability of the system, the DS 300/AD internal modem features autodial/autotransfer and direct connect, which reportedly allows Kaypro to compete more directly with other portable computers. It comes with operational software and installs without drilling, soldering or computer modification, according to a vendor spokesman.

Priced at \$225, the modem is available from Datastyles, 509 S. Fern, Wichita, Kan. 67213.

Analog Devices Offers Converter

NORWOOD, Mass. — A 16-bit analog-to-digital converter has been introduced by Analog Devices, Inc., which said the device guarantees low maximum power consumption rates.

The ADC1143, according to Analog Devices, is suited for power-critical applications requiring conversion of low-level, wide dynamic range signals.

Primary applications reportedly include battery-powered designs such as seismic data acquisition, portable industry scales, data loggers and portable test equipment.

Two models, J and K, are available for \$149 and \$172, respectively; delivery is two to four weeks. More information is available from Analog Devices, P.O. Box 280, Two Technology Way, Norwood, Mass. 02062.

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...to work with existing performance
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...the system's performance, the code
...the system's performance, the code

SPSS

...the system's performance, the code

...the system's performance, the code

...the system's performance, the code

Software/Modem Tool

EPS/Comm Links Units

NORCROSS, Ga. — Executive Presentation Systems Corp. (EPS) has announced a software/modem package said to allow its EPS computer to

PE Purchases, Reduces Price Of Workbench

OCEANPORT, N.J. — Perkin-Elmer Corp. has announced that it has purchased and reduced prices of the Edition VII Workbench that it previously offered via a marketing agreement with The Wollongong Group.

A general purpose, interactive time-sharing operating environment designed to accommodate up to 128 users, the Edition VII is now priced according to the processor used and the number of terminals supported, according to PE.

The unit reportedly supports the Unix operating system.

Single purchase prices start at \$2,500.

Further information is available by contacting Perkin-Elmer's Data Systems Group, located at 2 Crescent Place, Oceanport, N.J. 07757.

CCL-200 Extends DEC Interface To Two Miles

CANOGA PARK, Calif. — Canoga Data Systems, Inc. has introduced an interface said to provide additional communications capabilities to the Digital Equipment Corp. DMR/DMC interface used with the VAX and PDP series on minicomputers in the Decnet network.

The CCL-200 extends the distance of DEC's interface capability up to two miles and allows the user to operate at the full 11 Mbit/sec, according to a vendor spokesman. The CCL-200 is an addition to Canoga's high-speed data line, which includes asynchronous multiplexers, synchronous multiplexers, modems and other communications products.

The CCL-200 with DEC DMR/DMC interface is available for \$875 from Canoga Data Systems, 21218 Vanowen St., Canoga Park, Calif. 91303.

Line Expander Offered by 3M

ST. PAUL, Minn. — 3M Corp.'s Interactive Systems Division has introduced the IS/3M Model 6641 Series Line Expander, an active baseband repeater.

The Model 6641 Series Line Expander is said to increase the flexibility of the IS/3M Model 6600 series multiplexer network by enabling the network to operate in star, extended star, multidrop or combination star and multidrop configurations.

Priced at \$250, the expander is available through 3M, Box 33660, St. Paul, Minn. 55133.

communicate with most other computers, including subscription data bases, and to send or receive telephone files.

EPS/Comm reportedly allows a computer to answer the telephone and transfer files when the user is absent.

Owners of EPS desktop computers need only add the software and modem package to existing systems, according to the vendor.

The price for the package, which includes software, modem, manual along with cables, is \$1,115, the vendor said.

Executive Presentation Systems is located at 5854 Peachtree Corners East, Norcross, Ga. 30092.

Print Spooling Release Serves IBM's CICS Users

MOUNT FREEDOM, N.J. — A new release of its CICS print spooling software system for CICS users under IBM's DOS/VSE has been announced by Macro 4 Inc.

The new release, VM 1.9, contains four new facilities, according to the company, three of which are "no charge" features.

Virtual printer transfer facility, according to Macro 4, allows printout from nominated VM machines on the VM spool file to be transferred to the power spool files; after transfer to the power queue, jobs can then be printed on the system printer on any CICS at-

tached printer.

The other new facilities are LST accounting, causing Power LST account records to be produced whenever a Power LST job is printed, and data compression, said to reduce line transmission by replacing strings of five or more like characters with repeat-to-address orders, the vendor said.

The virtual print transfer facility is available for \$40 a month on a one- or two-year lease, while the others are "no charge" features. The marketing department of Macro 4 is located at 1 W. Hanover Ave., Mount Freedom, N.J. 07970.

How to make work like a

First, neatly cut out the "370" label.

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Use dBASE II to help make your choices.

If you've got a 96k IBM PC, send us \$700 and we'll send you a copy of dBASE II to use free for 30 days.



'Benchmark' Gets Spreadsheet

CASA GRANDE, Ariz. — Metasoft Corp. has announced the addition of a three-dimensional spreadsheet and a color graphics package to its Benchmark software products.

The Financial Planner is a three-dimensional spreadsheet said to allow the user to choose between a wide document or conventional pages. Available for the IBM Personal Computer and the IBM XT, the package reportedly contains its own programming language and requires 128K bytes of memory and two floppy disks or a hard disk.

The graphics package reportedly generates pie and bar charts and graphics that can be mixed with text. The package is available on the Victor Business Products, Inc. 9000, IBM

Personal Computer and IBM XT, a vendor spokesman said.

The Financial Planner is priced at \$395 and the graphics package costs \$599, according to the spokesman for

the firm.

More information is available from Metasoft at Suite E, 711 E. Cottonwood Lane, Casa Grande, Ariz. 85222.

Four-Port Multiplexer Provides Link to Seiko Color Hard Copier

MILPITAS, Calif. — The Graphics Devices and Systems Division of Seiko Instruments U.S.A., Inc. has introduced a four-port multiplexer said to allow up to four Seiko GR-1104 graphics terminals to connect to the Seiko CH-5201B color hard copier through a Centronics Data Computer Corp. interface.

Said to reduce paper costs with the graphics terminal/copier connection, the stand-alone multiplexer unit is priced at \$1,950.

The GR-1104 desktop graphics terminal costs \$4,950 and the CH-5201B color hard copier is priced at \$8,950 from Seiko Instruments at 1623 Buckeye Drive, Milpitas, Calif. 95035.

e your micro mainframe.

Instead of just poring over a manual, run it and make sure that it does what you need done. Then if you find it isn't right for you, send it back and we'll return your money, no questions asked.

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Call (213) 204-5570 today or drop by your local computer store for the rest of the story.

Ashton-Tate, 10150 W. Jefferson Blvd., Culver City, CA 90230.

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RCA Service Offers Terminal For TWX/Telex

NEW YORK — RCA Service Co. has announced the RCA Model 745XT data communications terminal said to handle applications from TWX and telex communications and electronic mail to automated dealer and distributor networks and sales force automation.

The terminal reportedly features instant data base access, off-line editing, direct-distance dialing, standard phone jack or acoustic coupler hook-up, a standard typewriter keyboard, 14 alternate fonts, capability of 16K bytes of random-access memory and 80- or 132-col. formats.

Carrying a lease/service price of \$60 per month, the terminal is available from RCA Service, Rt. 36, Cherry Hill, N.J. 08358.

AT&T's DDS Topic of Report

RAMSEY, N.J. — CCMI has added a report on AT&T's Dataphone Digital Service (DDS) to "Telecommunications Applications & Practical Solutions," a continuing series of educational reports for the industry.

"A Users Road Map for DDS" reportedly provides an overview of AT&T's "data under voice" system approach and a definitive analysis of the DDS rate structure. The report is liberally illustrated and contains numerous examples of using DDS network services, a CCMI spokesman said.

"A User's Road Map for DDS" is available for \$14.50 per copy from CCMI, 76 Arch St., Ramsey, N.J. 07446.

Unit Emulates, Compatible With TD830

BLACKWOOD, N.J. — Data Access Systems, Inc. has introduced a terminal said to be compatible with and to emulate Burroughs Corp.'s TD830 terminal.

The Visual Model 383 features a 14-in. nonglare screen, 16 programmable function keys that can reportedly store up to 350 bytes in a non-volatile memory and detachable keyboard, according to a vendor spokesman.

The unit is also compatible with Visual Technology, Inc.'s VS420, Burroughs' SR100 and SR110 terminals.

The Model 383 costs \$1,595 from Data Access Systems at Cole Road, and Camden Ave., Blackwood, N.J. 08012.



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Sentinel Unwraps Micro Workstation For Multisuser Line

CINCINNATI — Sentinel Computer Corp. has unwrapped a Digital Research, Inc. CP/M-compatible microcomputer workstation the company said will complement its current line of multisuser systems.

The Workstation Model S-100 desktop system can be used with either local or remote Sentinel printers and CRTs, a spokesman noted. It features 64K bytes of random-access memory, two 5¼-in. diskette drives, a 4-MHz version of Zilog, Inc.'s Z80A microprocessor and the ability to read multiple diskette formats.

The desktop system comes standard with word processing, spelling checking and correction, financial spreadsheet analysis, Basic and other application software, operating system software and programming tools.

The 8-bit system costs \$1,995, the company said from Sentinel, located at 9902 Carver Road, Cincinnati, Ohio 45242.

Tape Drive Sales Seen Spiraling in '83

WELLESLEY, Mass. — Fueled in large part by the cartridge tape segment, computer tape drive industry sales are projected to reach \$4 billion by year's end, up from 1982's \$1.7 billion figure, according to a report recently released by Venture Development Corp. (VDC), a market research firm here.

The report, titled "The Computer Tape Drive Industry: A Strategic Analysis, 1983-1987," said that in 1982, cartridges made up 7.2% of the total tape drive shipments. However, by 1987 they will command a 14.8% share of the total tape drive dollar shipments.

With 16- and 32-bit minicomputers now using 300M- and 600M-byte 14-in. disk drives, the report predicts that the most popular tape drive product will be the half-in. streaming cartridge variety. By including group coded recording formats in half-in. streamers, recording densities to 6,400 bit/in. and capacities to 150M bytes, the half-in. streaming cartridge drive will become the preferred disk backup option over its start/stop counterpart, the report theorized.

Price Battles to Intensify

The report cautions, however, that tape drive manufacturers should be aware that hard disk drives and computer systems are both declining in price, thus providing greater cost-effective storage. Price battles will continue to intensify, the report noted, as more competitors enter the magnetic peripherals fray.

VDC analysts predict manufacturers of floppy disk drives will not be able to mount a successful counterattack on any tape drive market segment with the exception of cassettes. With fixed media drives' storage capacities increasing rapidly, floppy

Maintenance Agreements Require Careful Monitoring

By Richard Raysman

Special to C&E

Users of data processing equipment are often totally dependent upon the continuing operation of their equipment for the success of their businesses. If the equipment fails to operate for any significant period of time, there is a possibility that the user could be out of business. Often, what stands between the data processing user and continuous operation of the equipment is a hardware maintenance contract with the vendor.

Computer hardware requires constant attention. As a result of the hardware user's absolute need to keep his equipment functioning properly once it is installed, maintenance agreements are a necessary element in every computer acquisition transaction. From the vendor's point of view, a maintenance agreement can be a continuing source of revenue.

A recent example of the difficulties with a maintenance agreement occurred with mainframe equipment that was installed on an island in the Bahamas. The vendor salesman had given oral assurances to the purchaser that maintenance service would be available, without addressing the important issue of location of the installation.

After the hardware was installed, the user was distressed to find that the in-

stallation did not qualify for the vendor's standard maintenance agreement since the installation was not in the "mainland U.S." The only maintenance available to the user that was provided by the vendor required a payment based on time and material, which was very expensive. Thus, the cost of providing maintenance had enormous impact on the overall cost of operating the user's computer facility.

Third-Party Lease

Particularly where third-party financing is involved, the maintenance agreement issue should be separately addressed by the user. For maintenance, the user/lessee must deal directly with the equipment vendor or a firm authorized to maintain the equipment for such service. The user/lessee must be certain that such a maintenance agreement can be negotiated before the leasing arrangement is completed, or he may find himself with equipment that will not operate due to the unavailability of required routine repair service.

Further, the user should be certain that the maintenance period commences on the same day that the warranty period expires. Otherwise, he may either be paying extra maintenance charges for services that should be received under warranty or, alterna-

(Continued on Page 78)

study forecasts tape drive shipments in all segments in both units and current dollars through 1987 and profiles

major players and users of tape drives. The analysis focuses on the tape drive components, technologies, competitive technologies and the structure of the tape drive industry.

The report costs \$2,790 and is available from VDC, One Washington St., Wellesley, Mass. 02181.

CAE Station Aids in Design Of Digital Electronic Systems

SUNNYVALE, Calif. — A computer-aided engineering (CAE) station for the design of digital electronic systems, said to function both as a stand-alone, 32-bit-based CAE design station and as part of a computer network including mainframes such as the IBM 3081 and the Digital Equipment Corp. VAX-11, has been announced by Valid Logic Systems, Inc. (VLS).

Scaldsystem II reportedly can operate with all of the vendor's Scald software validation tools as a design station or as part of a host-based configuration. When operating in a stand-alone mode, the system gives the designer a dedicated 32-bit processor for validating designs, plus a 16-bit processor for graphical capture schematics.

Also, the system can use mainframe resources to run VLS' verification programs in a user-transparent mode. A wide range of communications facilities are said to allow the Scaldsystem to communicate with hosts or other Scaldsystems such as the Scaldsystem I and Scaldstar.

Data can be transferred at a speed of up to 10 MB/s, according to a vendor spokes-

man. Terminal emulation of DEC's VT-100 or IBM's 3270 is available.

The Scaldsystem II is self-contained in a free-standing table that includes a 20-in., high-resolution, 1,024 by 800 pixel CRT terminal; a pluggable keyboard with full ASCII and programmable function keys; and an integrated graphics table. The system's memory includes a 35M-byte disk, a 45M-byte 1/4-in. cartridge tape and 2M bytes of main memory.

A second Scald graphics design station can be added, reportedly enabling the user to share a CPU while maintaining individual Intel Corp. 8086-based graphics engines. Color is also available as an option.

The Scaldsystem II uses the Unix operating system, and users receive a Unix license that allows free use of a variety of utilities and libraries that have been developed by Western Electric and Bell Laboratories.

Available immediately, pricing for the Scaldsystem II design station ranges from \$55,000 to \$75,000.

VLS is located at 650 N. Mary Ave., Sunnyvale, Calif. 94086.

SYSTEMS & PERIPHERALS

Image Processing System Out From Vicom Systems

SAN JOSE, Calif. — Vicom Systems, Inc. has announced the Vicom-DIP, a multistep, multitasking digital image processing system.

The Vicom-DIP can simultaneously acquire, process, display and record images without the support of a host processor. It supports two users, each capable of independently accessing the unit's library of image enhancement and manipulation capabilities which include: point processing, spatial convolution, edge detection, texture analysis, zoom, roam and other scanning func-

tions, the vendor said.

The unit can support one of a variety of display combinations: two independent true color displays, two monochrome images enhanced with pseudocolor, six different monochrome image displays or selected combinations of monochrome and color.

The Vicom-DIP is based on a Motorola, Inc. 68000 microprocessor and costs from \$32,000 to \$100,000, depending on the number of display buffers configured for multistep versions of the system. Vicom said from 2307 Bering Drive, San Jose, Calif. 95131.

Auto-Trol Unveils Desktop

DENVER — Auto-Trol Technology Corp. has followed up its Advanced Graphics Workstation with a 32-bit desktop system that is compatible with all of its predecessor's software.

Besides the 32-bit processor, the AGW II consists of the firm's Ageis virtual memory operating system, a 17-in. black-and-white raster display monitor that has a 1,024- by 800-pixel resolution and either the Auto-Trol Series 5000 or Series 7000 graphics software, the vendor said.

The CPU and display monitor are housed in a single integrated unit along with two standard serial RS-232C I/O ports and one port that is normally used for an optional input tablet. The disk unit has a 1.2M-byte floppy disk, which is packaged sep-

arately in a free-standing module. An 8-in., 34M-byte Winchester disk drive is also available, the vendor said.

The AGW II costs about \$60,000 from Auto-Trol Technology, located at 12500 Washington St., Denver, Colo. 80233.

Update Offered For Summadraft

FAIRFIELD, Conn. — Summagraphics Corp. is offering an updated version of its Summadraft computer-aided design and drafting system that is built around Data General Corp.'s Microclipse microprocessor and is reportedly three to four times faster than its predecessors.

Called the Summadraft S-Series, the upgrades are compatible with all currently available Summadraft system application software that is used in both architectural, engineering and construction and printed circuit board marketplaces.

The S-Series features DG Microclipse, which adds more flexibility, reliability and compatibility to the system. The microprocessor is capable of supporting up to 512K bytes of main memory and all standard DG peripherals, the vendor said. In addition to the Microclipse microprocessor, the S-Series includes an ergonomic workstation with a 20- by 20-in. digitizer for menu selection and cursor control. Tilt-and-swivel mechanisms can also be added to the graphics CRT terminal, the vendor said.

Added hardware functions on the S-Series include hardware pan and zoom, rubber banding and dynamic drag, the vendor said.

The updates to the Summadraft cost between \$15,000 and \$24,000. Summagraphics said, from 35 Brentwood Ave., P.O. Box 781, Fairfield, Conn. 06430.

McAuto Adds Workstations To Unigraphics

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has added two graphics workstations to its Unigraphics mechanical computer-aided design and manufacturing (CAD/CAM) software.

The Model D-90 workstation is equipped with a 19-in. monochrome raster terminal emulating a direct-view storage tube, system message monitor, graphics function keyboard with joystick and keyboard. The unit costs \$17,500, the vendor said.

The M-150 workstation, a complete CAD/CAM system, includes a Data General Corp. MV/4000 supermicrocomputer with 1M byte of main memory, a 73M-byte Winchester disk, streaming tape drive, graphics display terminal, Unigraphics software and the Grip programming language. The M-150 will support a second workstation without modification, the vendor said.

The base price for the M-150 is \$98,000, McAuto said from its headquarters in St. Louis, Mo. 63166.

WHAT THE HECK IS AN EXECUTIVE WORKSTATION?

A lot of people have the wrong idea of how you should use a personal computer. And fancy phrases like "executive workstation" only hide the benefits of personal computing under a cloud of tech-babble.

The fact is, an executive workstation is a computer on every desktop doesn't always mean bigger profits and more efficient workers.

Because when "non-computer people" use personal computers in business, the software they use is always more important than the hardware that's used with it.

But sometimes this software's just too hard to use, or can't do the job. Or it's already out-of-date. All of which confuses the same people it should be helping. We'd like to clear up some of that confusion.

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While using the MBA's spreadsheet function, you can instantly graph and chart vital figures on the same screen. So, as you make cost or revenue assumptions, you can see immediately how the result would affect your business - this year, and five years from now.

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Computer-Aided Drawing Workstation Out

PITTSBURGH — Formative Technologies, Inc. has announced Form:Draw, a computer-aided drawing workstation based on a specialized 32-bit processor manufactured by Three Rivers Corp.

Designed for professionals in architectural, engineering and construction industries, the system can be used for design analysis and production functions. When used with Formtek's freehand sketching, spreadsheet and word processing software, the workstation can be used as an integrated system, the vendor said.

Form:Draw offers graphics features including: zoom and pan, mul-

ti-ple-screen windows, rubber banding and dragging and unlimited layers. Also featured are user-configurable, on-screen menus with icons, a function key approach for command input and an on-line Help facility, the vendor said.

Each workstation is equipped with a high-resolution (1,280- by 1,024-pixel, 100 dot/in.), 19-in. black-and-white monitor and a three-button mouse controller. In a basic configuration, the workstation includes 1M byte of main memory, a 32M-byte Winchester disk drive and an 8-in. 1M-byte floppy disk drive. Individual workstations can be organized into a standard Xerox Corp. Ethernet

local-area network to share peripherals such as plotters and printers.

The Form:Draw workstations cost

between \$49,000 and \$69,000, Formative Technologies said from 5001 Baum Blvd., Pittsburgh, Pa. 15213.

Features Added to Blue Lynx For IBM Micro Emulation

NEW YORK — Techland Systems, Inc. has added features to its IBM 3276-emulating Blue Lynx hardware/software system that allow it to emulate IBM's Personal Computer.

The enhancements allow the system to support multiple printers as separate logical devices that will ac-

commodate host-initiated print as a foreground or background task, a spokesman explained.

In addition, Blue Lynx now reportedly incorporates host- or user-initiated uploading and downloading of files and support of the mainframe using Bisynch protocol. Blue Lynx was previously available only with Synchronous Data Link Control (SDLC) protocol, the company noted. Blue Lynx is available with Bisynch hardware and software for \$650; with SDLC hardware and software for \$690; and with Bisynch and SDLC combined for \$1,080 from 25 Water-side Plaza, New York, N.Y. 10010.

Graphwriter Gets Ability to Create Instant Slides

WALTHAM, Mass. — Graphic Communications, Inc. has announced an instant 35mm slide capability to its Graphwriter package which is compatible with IBM's Personal Computer.

With this capability, Graphwriter users will be able to create business graphics images such as pie, bar and line charts and then expose those images to Polaroid Corp.'s instant transparency films or Polaroid 3- by 4-in. color print film using Polaroid's computer image recorder.

Slides or prints produced using the package have a resolution of 640 lines horizontal by 400 lines vertical with up to 72 colors using either a monochrome or color graphics display. This resolution, which is four times the standard IBM color graphics resolution, is achieved using the standard IBM graphics adapter board and the interlacing capabilities of the image recorder, the vendor said.

The Polaroid photo system costs \$1,500 and the Graphwriter package costs from \$395, Graphic Communications said from 200 Fifth Ave., Waltham, Mass. 02254.

OmniCalc

the First and Fastest Electronic Spreadsheet for CICS
is now available for CMS

Just one more reason why you don't have to buy microcomputers to run electronic spreadsheet applications. OmniCalc is designed to expand the computing and modeling power of your IBM mainframe. Large, multi-user systems may use this valuable planning tool as a CICS or CMS application. With OmniCalc, users can immediately analyze data for financial schedules, statistical distributions, cash and capital budgeting, sales and expense forecasts.

Users find it easy to design their own unique matrix formats and enter instructions for any "what if" problems. Once the application has been designed, as many changes as desired can be made to the information by simply entering new values. The computer will instantly recalculate and redisplay the results at every location affected. Some of the more significant features of OmniCalc are:

- Variable Cell Size
- Variable Matrix Size
- Hard Copy Printer Support
- Data Encryption for Security
- Three-Dimensional Matrices
- Foreign Language Support
- Data Base/User File Interface
- Split Screen Viewing
- On-Line HELP File
- Password Protection

OmniCalc reduces the long hours associated with worksheet planning by eliminating the need for manual work papers, pencils, erasers and calculators. Best of all, OmniCalc can be used by everyone with access to a CICS or CMS terminal. And, there is nothing else to buy.



Maintenance Contracts Merit Close Monitoring

(Continued from Page 75)
tively, he will find that there is a gap between the warranty and maintenance period during which time he has no right to receive any maintenance service whatsoever.

A hardware maintenance agreement provides some important leverage for the vendor. If the user fails to pay his monthly lease payments, the vendor can threaten to cut off maintenance service. This has the effect of compelling the user to continue to make monthly lease payments that are otherwise unrelated to equipment maintenance.

There is a wide variation in maintenance agreements concerning additions of peripheral equipment not furnished by the supplier of the origi-

inal hardware configuration. Some vendors have a policy of not maintaining peripherals supplied by outside manufacturers. The vendor will also probably charge extra for repairs to the original hardware for malfunction caused in some way by the use of such peripherals.

The standard often considered most important by the user is the maximum amount of time that is permitted to elapse between the user's notification to the vendor of a problem with the hardware and the vendor's arrival on the user's premises. This is normally referred to as maintenance response time. Four to eight hours is a common response time commitment, although this commitment can vary depending upon dif-

fering circumstances.

Westfield vs. Burroughs

Failure of the user to negotiate realistically a maintenance agreement for his hardware can ultimately deprive him of a remedy if the vendor fails to perform. Such a circumstance occurred in the lawsuit Westfield Chemical Corp. vs. Burroughs Corp. Westfield and Burroughs entered into agreements for Westfield to acquire from Burroughs hardware and software for a computer system to process Westfield's accounts.

Westfield soon became dissatisfied with Burroughs' attempts to install the computer system. Westfield brought suit against Burroughs seeking damages for breach of contract,

breach of express and implied warranties, fraudulent inducement and negligence in connection with the manufacture, sale and servicing of the computer system.

Westfield's claim for breach of contract was partly based on allegations of excessive delay by Burroughs in its performance of maintenance on the computer hardware. Hardware maintenance had not been provided for in a separate agreement, but was included as a brief section in the standard Burroughs equipment sales form agreement.

The maintenance section provided that Burroughs would supply hardware maintenance services at no extra charge beyond the hardware price for a period of 12 months from the date of sale. Both preventive and remedial services were to be supplied by Burroughs.

Although the agreement briefly described the nature and extent of preventive service, there was not a substantive description of the manner in which remedial services were to be performed.

Further, Burroughs expressly disclaimed "any liability for losses or damages caused by delays or any other matter of any nature whatsoever in the rendering of equipment maintenance."

The court held that Burroughs would not be liable for damages or losses in the rendering of the maintenance.

The court further held that Westfield could not recover for damages allegedly caused by delays in rendering of maintenance coverage. Westfield was thus denied any recovery from Burroughs on the basis of inadequate maintenance.

The foregoing lawsuit illustrates that computer users should carefully plan for maintenance service during contract negotiations. Westfield in advance that such services will be adequately provided. Otherwise, there may be serious maintenance difficulties after installation of the equipment.

Raymond is a member of the New York law firm of Brown, Rayman & Milstein and is chairman of the New York State Bar Association Computer Law Subcommittee.

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The Eagle PC-2, a turnkey system which includes operating systems, word processing and financial planning software for as low as \$3495. And if you need more, Eagle has more. The PC-XL, with 10 megabytes of hard disk storage and high resolution graphics, starting at \$4495.

An outstanding linkup. But buy your Eagle elsewhere and you're faced with searching out peripheral equipment, ordering supplies,

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CAD/CAM Unit Introduced

BOULDER, Colo. — Graphics Technology Corp. has announced Comet, a mechanical computer-aided design and manufacturing (CAD/CAM) system said to support as many as 12 users simultaneously.

The 32-bit unit comes with 1M byte of main memory, a 160M-byte Winchester disk drive, a 45M-byte cartridge tape unit for disk backup and archival storage, one of the firm's 16-color Meteor intelligent workstations and the firm's Geometric Modeling software for two- and three-dimensional mechanical design, the vendor said.

The standard Comet system costs \$95,000, including installation and training. Graphics Technology said from 1777 Conestoga St., Boulder, Colo. 80301.

NCS Turnkey System Bows

MINNEAPOLIS — National Computer Systems, Inc. (NCS) has unveiled a turnkey data collection and information processing system for the human resources marketplace.

The Employ-Ease system utilizes the NCS Sentry Plus hardware, including an NCS Sentry 3000 scanner and an IBM XT, the hard disk version of the IBM Personal Computer. The system captures and stores data and generates reports, according to a spokesman for the vendor.

In addition to the system's basic capability to administer and score tests and surveys on scannable

forms, information processing modules include employment selection, employee data, government compliance and administrative data. Prices of the modular system start at \$15,000 from National Computer Systems, 4401 W. 76th St., P.O. Box 9365, Minneapolis, Minn. 55440.

Data Collection System Unveiled

PROVO, Utah — Dynamic Time Systems has announced a microprocessor-controlled data collection and reporting system said to gather work-in-progress data from each operational or production area.

The Timesystem II Production Area Data Collection and Reporting System is a stand-alone system that features a full complement of soft-

For Teaching Programmers

Ada Support Package Out

FORT LAUDERDALE, Fla. — Gould Inc.'s S.E.L. Computer Systems Division has announced the Ada Learning Environment (ALE), a hardware, software and support package designed to teach program-

mers how to use the Ada language required by the U.S. Department of Defense.

Available in three packages featuring different model Gould Concept/32 computers and 8-, 16- or 32-bit CRT terminals, each package includes the Gould UTX operating system, IC5A-Ada Translator, on-site training, installation and documentation.

Prices start at \$129,000, or monthly rental of \$9,716 with maintenance; Model 1815-9 ALE software costs \$30,000. Further information is available from Gould S.E.L. Computer Systems Division, 6901 W. Sunrise Blvd., P.O. Box 9148, Fort Lauderdale, Fla. 33310.

Graphics Unit For CAM/CAE Fits VT100s

TOKYO — The Nippon Computer Co., Ltd. has announced the release of a graphics terminal designed for computer-aided manufacturing and engineering (CAM/CAE) applications. The terminal is said to be compatible with the Digital Equipment Corp. VT100 and the Tektronix, Inc. 4010/4014.

The NJC-C1922 Color Graphics Terminal comprises a detached keyboard and main unit, which contains a 19-in. color monitor, CRT controller, graphics processor and communications section. The terminal features 1,024-by-780-pixel resolution, 16-color display, advanced text editing and communications functions.

The NJC-C1922 costs \$9,950 from Nippon, Naito Building, Nihonbashi Hamacho 2-25-1, Chou-ku, Tokyo 103, Japan.

Batch Subsystem Introduced

SAN DIEGO — North America MICA, Inc. has introduced a batch processing subsystem that can be added to its Critical Path Project Management and Resource Management systems.

The BPS-II reportedly allows the user to predefine a series of projects to be calculated and reported and then to run those project calculations and reports on a regular basis with no further operator intervention. Under BPS-II, users can predefine, in multiple independent files, the following: projects to be processed, reports to be generated and the sort, select and format options to be used with the reports.

The BPS-II costs \$495 from North American MICA, located at Suite 100, 11772 Sorrento Valley Road, San Diego, Calif. 92121.



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CW 0808

Prints 200 Word/Min

Daisywheel Supports TRS-80

FORT WORTH, Texas — Tandy Corp. has released a daisywheel printer and a card reader for its Radio Shack TRS-80 microcomputer.

The DWP-210 daisywheel printer, designed for word processing applications, prints 200 word/min at 10

char./in. The unit features 10 or 12 char./in. pitch, or proportional spacing. The printer features a TRS-80 color computer-compatible serial interface and a standard parallel interface. The unit costs \$799 at Radio Shack Computer Centers.

The CR-510 card reader reportedly reads data from punched or marked cards and transfers the data to a

TRS-80 computer for use with applications programs. Designed for use with a TRS-80 disk-based computer with an RS-232 port, the unit reads cards in single feed, demand feed or continuous feed modes. The unit costs \$1,595.

Tandy Corp. is headquartered at 1800 One Tandy Center, Fort Worth, Texas 76102.

IBM Micro Receives Hard Disk Subsystem

BELLEVUE, Wash. — CMC International has announced three different versions of a hard disk subsystem for the IBM Personal Computer.

The Targa II is available in three models: a single-drive-only machine, the Model 1, which offers three formatted storage capacities in 5-, 10- or

15M-byte configurations; the Model 2, offering the same basic configuration as the Model 1 with the addition of a slot to add a second drive; and the Model 3.

The Targa II costs from \$1,490 for a Model 1 to \$2,445 for a Model 3 from 1720 130th Ave. N.E., Bellevue, Wash. 98005.

Units Monitor Power Lines

EDISON, N.J. — Dranetz Technologies, Inc. has announced two Remote Monitoring Units (RMU) said to allow power line disturbance monitoring at many sites simultaneously.

The Model 626-RMU-1 is for single-phase ac, both line-to-neutral and neutral-to-ground. The Model 626-RMU-3 monitors three-phase ac, plus neutral-to-ground and dc lines, the vendor said.

Both units measure, summarize and record sags, surges, over- and undervoltages and impulse disturbances, a spokesman said. All setups and data reports are made by connecting the RMU to the vendor's Series 626 Universal Disturbance Analyzer, according to the vendor.

The Model 626-RMU-1 costs \$1,595; the 626-RMU-3 costs \$2,950, from Dranetz Technologies, 1000 New Durham Road, CN-91, Edison, N.J. 08818.

Analyzer Oversees Signals

SANTA CLARA, Calif. — Personal Computer Products has announced an RS-232 line analyzer capable of monitoring nine RS-232 signals displaying their status on bi-color LEDs.

The device is capable of monitoring inactive, as well as high and low, signals. Internally, the analyzer has switches that can be used to interconnect most common computer to computer interfaces. Also supplied is the ability to cross-wire any connection necessary to connect devices, the vendor said.

The analyzer is a plug-in type and simplifies the task of hooking up RS-232 devices such as letter-quality printers and microcomputers, the vendor claimed.

The unit costs \$149.95, Personal Computer Products said from Suite C-18, 1400 Coleman Ave., Santa Clara, Calif. 95050.



Bits & Pieces

Conditioners Out For Power Lines

SAN DIEGO — Topaz, Inc. has announced its three-phase Line 2 power conditioners designed to protect computers and peripherals against problem-causing electrical power disturbances.

The power conditioners are said to feature noise suppression, microcomputer-controlled voltage regulation

of levels as high as 13% above nominal and as low as 25% below nominal and up to 30 different output receptacle panels for convenient computer room power distribution.

Other features include UL listing, system status monitoring, overcurrent and money-saving 94% power efficiency, the vendor said. Models are available for 90-

Hz or 60-Hz operation and in power ratings from 10 kVA to 30 kVA. Prices start at approximately \$7,300 from Topaz, located at 3855 Ruffin Road, San Diego, Calif. 92123.

Perma Electronics Unveils Suppressors

CHICAGO — Perma Power Electronics, Inc. has announced the Socket Plus line of surge suppressing devices.

The multiple outlet strips and outlet boxes are designed for use with electronic business equipment and small home and business computers. The units protect against two types of voltage surges: the normal mode surges most often caused by other equipment on the same power line being switched on and off and the common mode surges most frequently caused by lightning, the ven-

дор said.

There are two types of surge suppression devices. The first group offers single-stage suppression of power line transients. The second group offers two-stage filters. Both units are available in one, four or six-outlet versions.

The single-stage units range in price from \$30 to \$48, while the two-stage units have a price range of \$57 to \$75. Perma Power Electronics said from 5615 W. Howard Ave., Chicago, Ill. 60648.

Advanced Digital Unwraps Computer

GARDEN GROVE, Calif. — Advanced Digital Corp. has unveiled an S-100- and the IEEE-696-compatible, single-board computer that uses a 6-MHz version of Zilog, Inc.'s Z80B microprocessor and contains 128K bytes of bank-selectable, random-access memory.

Called Super Six, the board also contains four serial and two parallel printer ports, a floppy disk controller that enables the board to accommodate both 5¼-in. and 8-in. drives. The device also features a Z80B counter timer chip that takes care of real-time interrupts and a Z80 direct access controller.

The board is software-compatible with Digital Research, Inc.'s CP/M 2.2, CP/M 3.0, MP/M II and Software 2000, Inc.'s Turbosoft operating systems, Advanced Digital said from 12700-B Knott Ave., Garden Grove, Calif. 92641.

Discovery D Micro Uses Zilog, Intel Chips

PASADENA, Calif. — Action Computer Enterprise, Inc. has announced the Discovery "D" model multitier microcomputer, which is based on Zilog, Inc.'s Z80 and Intel Corp.'s 8086/8087 microprocessors.

The unit's standard configuration also includes a 28M-byte Winchester disk drive, according to a vendor spokesman.

Features reportedly include simultaneous operation of both 8- and 16-bit software and support for up to seven users.

In addition, the system allows simultaneous presentation of both 8- and 16-bit microprocessors on an S-100 bus, with each user having his own CPU and dedicated memory, according to the vendor spokesman.

A 22M-byte Discovery system costs \$7,295, the vendor said.

Action Computer Enterprise is located at 430 N. Halsted St., Pasadena, Calif. 91107.

The new 970 from TeleVideo. Nothing else looks like it. Nothing else performs like it.



Productive office work depends on people and their equipment working efficiently together. That's why we have engineered the exciting new TeleVideo 970 to perform better than any other terminal.

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Our unique keyboard is designed to avoid user fatigue. We've created a natural palmrest, sculpted keys and the best ten-key accounting pad in the industry. Our non-volatile function keys save time and energy.

Like every feature of the new 970, the screen is designed for ease of use. Our non-glare 14-inch green screen is restful on the eyes, and its 132 column display can format more information. All in highly legible double-high, double-wide characters.

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As you probably know, most terminal downtime is caused by overheating that results from extended use. There's no such problem with our unique vertical convection cooling tower.

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feature that automatically turns it off after fifteen minutes of idle time.

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For more information about TeleVideo's new 970, call 800-538-8725, in California 408-745-7760.

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TeleVideo Systems, Inc.

Bits & Pieces

Para Systems Unit Regulates Power

ARLINGTON, Texas — Para Systems Corp. has announced an uninterruptible power supply unit providing standby emergency power and voltage regulation for most microcomputers, and word processors with a power rating of 200W or less.

Minuteman was designed to protect microcomputers from power failures, brown-

outs and voltage surges, according to Para Systems. When interruptions or outages occur, Minuteman immediately switches from ac power to its own emergency battery power for up to 15 minutes, providing time to close the system. When power is restored, the unit automatically switches back to ac power. The battery is automatically rechargeable, Para Systems said, and the unit

provides voltage regulation and surge protection.

The unit retails for \$395. Further information is available from Para Systems at 2409 D Ave. J, Arlington, Texas 76011.

Qume Sprint 11 Runs Ziyad Units

DENVILLE, N.J. — Ziyad, Inc. has added Qume Corp.'s Sprint 11 to the serial printers supported by its Z-2005

and Z-300S intelligent paper processors.

Key features of the Z-2005 and Z-300S with the Sprint 11 include: dual paper trays that hold up to 200 sheets, allowing the feeding of cut-sheet paper of variable lengths and widths; a feeder that tilts back from the printer for easy printing of non-standard-size paper; three optical sensors that continuously track paper position to

provide intelligence to the controller to prevent printing if paper is not available; a microprocessor-based serial interface controller; and software customized to operate in a small business system or micro environments that employs Micropro International Corp. Wordstar word processing applications software.

Single-unit prices with Sprint 11 are \$2,195 for the Z-2005 and \$2,695 for the Z-300S model, the vendor said from 100 Ford Road, Den-ville, N.J. 07834.

MSI/85 Matrix Printer

Measures 3 1/2 Inches

COSTA MESA, Calif. — MSI Data Corp. has announced the MSI/85, a dot-matrix printer that measures 3 1/2 inches long and attaches to the top of its hand-held data collection terminal.

The integral printer reportedly prints 16 alphanumeric char./line on 1 1/4-in. single- or double-ply paper at a rate of 60 line/min. Included in its 128 printable characters are 32 common international characters, all lowercase Ascii and numerous special characters. It is capable of printing in under-line, vertical or double-high/double-width modes. A graphics mode allows dot placement anywhere on the page.

Powered by rechargeable nickel-cadmium "batteries," the integral printer for the MSI/85 is list-priced at \$365. MSI Data is located at 340 Fischer Ave., Costa Mesa, Calif. 92626.

Facit Printer

Boasts Adaptability

NASHUA, N.H. — Facit, Inc. has introduced a daisy-wheel printer with several new features and a greater adaptability.

The Facit 4560 Generation II printer, which features a drop-in print wheel with up to 112 characters, reportedly has the added capability to be used with the Facit 5060 Cut Sheet Feeder. Its transmission rate and dual-line input package switches are accessible from the outside for change of functional parameters.

The new model offers bold face, shadow printing and automatic underlining. Generation II comes standard with a 2K-byte input buffer and RS-232C interface. Paper handling is friction feed with an optional tractor, and a cartridge ribbon is available in single- or multi-strike film.

The 22 char./sec printer costs \$1,095. Facit is located at 235 Main Dunstable Road, Nashua, N.H. 03061.

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For less than \$1800, you can plug in Tek's compact 4866 Color Graphics Copier. The 4865 uses a palette of 125 shades to produce report-size paper or film copies of on-screen displays at the push of a button.



Tek's new 4170 Local Graphics Processing Unit helps you conserve host power while you build on a central data base. The 4170 provides up to 886K RAM for CP/M-86-based stand-alone programming and pre- or post-processing on any

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Tektronix
Electronic Instruments Division

Despite Late Start, Experts High on DG Micro

By Jim Bartimo

CW Staff

Office automation experts and one of Data General Corp.'s biggest and newest users have given high grades to the firm's recently announced Desktop Generation series of microcomputers.

Despite the fact that DG is virtually the last entrant into the micro race, the Desktop Generation's dual-processor architecture and its compatibility with the minicomputer manufacturer's high-end machines met with especially favorable response in interviews last week. The machines were "well worth waiting for," said Thomas R. Billadeau, president of the Office System Consulting Group, Inc. of Cambridge, Mass.

The Desktop Generation is a series of four 16-bit micros that can operate as stand-alone machines or as part of a minicomputer-based distributed data processing, factory or office system [CW, July 23]. Each contains both a DG microcassette chip and an Intel Corp. 8086 chip, making it compatible with DG software and packages written for Digital Research Inc.'s CP/M 86 and Microsoft Inc.'s MS-DOS operating systems.

Calling the DG micros an industry trailblazer, consultant Billadeau said the Desktop Generation works well with DG's product line because it handles highly interactive applications locally (such as spreadsheet analysis), but

accesses the mini or mainframe for more complex but less interactive duties. "I think from an office automation perspective, it is a logical extension of DG's CEO [Comprehensive Electronic Office], Billadeau said.

'Micro users want applications... Users don't just want machines. Without the software, a micro is just a piece of sculpture.'

One large user of DG's CEO that recently announced a major contract with the firm for its micros is the U.S. Forestry Service. "We're signed to purchase up to 1,299 MV/4000 and MV/8000 32-bit superminis," noted Hermann Habermann, director of computer sciences for the Forestry Service.

Although Habermann is bound by federal policy not to guarantee DG a contract yet, "we have a need for micros and we'll go with something that's compatible with CEO."

The Forestry Service, which manages 178 million acres of land and employs 20,000 people, will use microcomputers for highly interactive dedicated applications such as fire dispatches in intelligent portables and for process control in experimental work. "The fact that the DG micros already run a lot of soft-

ware is a plus," Habermann said. "I think the concept of having a dual machine is an excellent one."

Research director John Callahan of Information Technology Research in Framingham, Mass., agreed. Data General is "committed to compatibility," he said, and the Desktop Generation "obviously fills a gap in its product line."

He added that "micro users want applications, and DG has given them that. Users don't just want machines. Without the software, a micro is just a piece of sculpture."

When the Desktop Generation is compared with DG's 1981 aborted attempt at the micro market — the Enterprise 1000 and 3000 — Callahan said, "The Enterprise was a failure, and they admitted it openly at the [Desktop Generation] announcement."

Another weak effort at putting micros into the DG environment was the IBM Personal Computer-Dasher Emulator package, according to Billadeau. The package was written for one specific user and then released as a product. "That user's needs were not too extensive, so the capabilities of that package were not too extensive," he said.

But Billadeau praised the Desktop Generation and DG's marketing strategy, aimed at small businesses as well as the Fortune 500. "It was nice to see a vendor sell to small businesses," he said.

System Prints Out Complaints

DA's Office Beats the Clock With WP

RIVERSIDE, Calif. — The district attorney for sprawling Riverside County in Southern California had a problem: how to get police reports and complaints, from nine widely separated cities covering 7,130 square miles, typed and delivered to the appropriate municipal court within 48 hours — the state deadline for either arraignment or releasing criminal suspects.

Don R. Inskip, Riverside County chief

Sony Expands WP, Adds Line Display

PARK RIDGE, N.J. — Sony Corp. has expanded its word processing system by adding a 25-line display screen and dual-sided micro floppy disk drives. Sony has also upgraded its portable word processor.

The Series 35 Word Processing System features a disk storage capacity of 600,000 characters on a high-density, 3½-in. disk. The Series 35 internal memory has been enlarged to 256K bytes, a spokesman said.

Digital Research Inc.'s CP/M operating system will run on the Series 35, which can accommodate additional applications such as spreadsheet analysis, billing, inventory, general ledger and Base II. The Series 35 is available for between \$6,000 and \$10,000.

Also upgraded was Sony's Typecorder Personal Word Processor, which now offers word wrap, improved cursor and scroll movement and delayed print. The Typecorder is available for a starting price of \$695.

More information is available from Sony Corp., Sony Drive, Park Ridge, N.J. 07656.

deputy district attorney, solved the problem with a computer-based word processing system that requires no special skills to operate. The system asks for basic information to be keyed in and then prints out a complaint.

"We were able to minimize the complaint processing time, make more efficient use of our existing personnel, increase the number of complaints we could process, eliminate more than 200 forms once used by our office, make more time available for police patrol and establish a more efficient word processing operation throughout the department," Inskip said.

Riverside County, south and east of Los Angeles County, stretches from the Arizona border on the east to within 15 miles from the Pacific Ocean on the west.

Because of the size of the county, the district attorney's office is also spread out. With a main office located here, the DA's crew is spread through a dozen offices in outlying cities. Distances between offices varies from a few miles to 200 miles.

"Simply getting the police reports eval-

uated and the complaint written created tremendous pressures and problems for satellite offices that have only one attorney assigned to them," Inskip recalled, "especially when that attorney has a heavy case load and numerous court appearances to make."

The county took stock of the situation several years ago and decided to purchase a word processing system. The system that answered the paper flow needs of the Riverside County's law enforcement and legal communities was a Digital Equipment Corp. PDP-11 minicomputer and a Word-11 word processing package from Data Processing Design, Inc. of Placentia, Calif. The hardware and software together cost \$130,000.

The district attorney's office entered into the computer the standard phrases and paragraphs necessary to draw up complaints for the 100 crimes most often charged, Inskip said.

The system is designed to require little technical training, Inskip said. Secretaries and stenographers use the equipment on a daily basis.

E-Mail Tool Aids IBM Micro

SAN JOSE, Calif. — Systar Corp. has announced features for its Message/1 electronic mail package designed to increase the IBM Personal Computer's flexibility and efficiency in electronic mail while reducing on-line operation time.

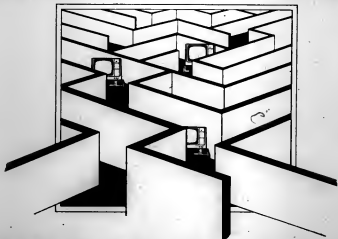
The Personal Computer support program, called PCMessage, allows users to prepare and edit messages off-line on a disk file and then allows the Personal Computer to send electronic mail over a

public data network for about 20 cents per 1,000 characters, a spokesman said.

Message/1 is a store-and-forward, computer-based message system that runs on the IBM Series/1 minicomputer. Major features include automatic log-on sequence and automatic print.

The Message/1 package is available for \$34,500. PCMessage for \$95 from Systar at Suite 208, 1762 Technology Drive, San Jose, Calif. 95110.

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Martin Marietta Poised For Software Growth

By Paul Gillin
CW Staff

BETHESDA, Md.—Sheathed in relative obscurity for years, Martin Marietta Data Systems, a division of Martin Marietta Corp., recently took the software industry by surprise. Late last month the firm completed a \$30 million deal to acquire Mathematica, Inc., a software and consulting company that markets the popular Ramis II fourth-generation language and data base management system.

The deal is the first part of a planned thrust by Martin Marietta into a broader range of applications software and information center tools centered around Ramis. Martin Marietta had previously been known best for its integrated line of manufacturing applications, processing services and turnkey systems.

Though still the smallest of Martin Marietta's six operating companies, Data Systems boasts a hefty \$120 million in annual revenues and a 25% growth rate. Earnings increased 34% last year despite dramatically lower earnings for the corporation. As a result, Martin Marietta this year accorded the Data Systems Division full operating company status.

That recognition, combined with the Mathematica deal, will make Martin Marietta Data Systems a more visible force in the software market, according to Rick Walters, Data Systems president.

Martin Marietta will now compete in a small arena of vendors that seek to offer total solutions consisting of both applica-

'Martin Marietta's game plan is based on its "strategic architecture" concept, which looks to make applications and even systems software independent from the hardware.'

tions and systems software. Walters sees a major struggle emerging among the titans of the software industry. "You're seeing guys like [Cullinet Software, Inc.] and MSA [Management Science America, Inc.] moving toward me and I'm moving toward them and there's a hell of a battle that will take place in the middle," he said in a recent interview.

Marin Marietta's visibility was boosted by Brenda Carter's much publicized but unfriendly takeover attempt of Martin Marietta last year. "Brenda-Martin Marietta changed the whole character of our ability to advertise and promote," Walters said.

Rick Walters

"Martin-Marietta is more of a household name now. And people are [therefore] much more interested in Martin Marietta Data Systems."

(Continued on Page 88)

Midyear Results Encouraging

Mainframer Profits on the Rise

By Bill Laberin

Earnings reported at the midyear mark by the mainframers show a continued, albeit moderate pace of recovery across the industry, particularly for those companies fortunate to be in the up side of major

Vendor comments on the results further show that corporate executives are anxiously awaiting the second half of 1983 and beyond, when recovery from the 18-month recession is expected to be in high gear. One analyst said, "The companies that took the time during the recession to trim down and get their product and personnel houses in order are going to do quite well. In fact, you'll be able to gauge which ones reacted most prudently by the bottom line results."

miniframers' results also contrast with those of many minicomputer

Study Reveals Silicon Valley Beginning to Lose Its Appeal

By Robert Batt

CW West Coast Bureau

PALO ALTO, Calif. — Evidence that California's Silicon Valley is continuing to lose some of its appeal for high-technology manufacturers was revealed in a recently published report by the Center for the Continuing Study of the California Economy.

In its report, titled "California Growth in the 1980s — Update 1983," the center, a private research organization based here,

"Between 1972 and 1981, the Bay area captured 49% of the state's high-tech job growth. Between 1981 and 1991, that share is projected to decrease to 41%," the report noted.

Over the same period, it added, the
(Continued on Page 90)

No-Nonsense Traffic Cop



Industry Touts Foreign Trade Surplus: Cbema

WASHINGTON, D.C. — The U.S. computer and business equipment industry is maintaining a positive balance of trade throughout most of the world, although trade deficits with Japan and Taiwan are increasing, according to figures compiled

by the Computer and Business Equipment Manufacturers Association (Cbema).

Basing its analysis on U.S. Census Bureau data for the first three months of 1983, Cbema projected that the industry's trade surplus will rise from last year's figure of

\$6.6 billion to a total of \$6.7 billion for 1983; it predicted total 1983 exports of \$12.3 billion, up from last year's \$11 billion, and total 1983 imports of \$5.6 billion, up from the 1982 figure of \$4.4 billion.

However, the trade associ-

ation pointed out, the first-quarter positive balance of trade dropped by 1.7% from \$1.96 billion in 1982 to \$1.569 billion in 1983.

During the first quarter, the industry's negative trade balance with Japan increased by 44.8% to \$433.6 million, according to Cbema's analysis; the deficit with Taiwan increased 117% to \$26.5 million. Japan exported \$669.7 million in computer and business equipment during the first quarter, an increase of 28.8% from the first quarter of 1982.

The analysis showed that

industry exports increased to the Middle East (71.6%), Far East (32.6%), European Economic Community countries (18.8%) and to Australia and Oceania (5.1%). Exports were down to the East European countries (55.8%), South America (30.4%), Africa (17.1%) and down 4.5% to West European countries outside the Common Market.

Cbema said that first-quarter 1983 exports of DP equipment and parts increased 17.7% to \$1.05 billion, while exports of business equipment and parts declined 17.1% to \$470.2 million.

Mainframer Profits on the Rise

(Continued from Page 85)

share, respectively. John Lewis, Amdahl president, said the results reflect volume shipments of Amdahl's top-line processors from the 5800 series, the IBM 3080 series mainframes. Volume shipments of the 5840 were delayed about eight months as the company struggled to meet performance benchmarks. Recently the company announced the problems related to the 5860 had been resolved and volume shipment were proceeding more in line with plans.

"We should benefit from

the continuation of market demand for high-performance, data processing products which has been realized with the recent improvement in the economy," Lewis said.

NCR Corp. reported a 6% quarterly earnings increase to nearly \$69 million or \$2.51 per share, compared with \$59.5 million or \$2.23 per share the same quarter a year earlier. Revenues in the quarter rose 7% to \$932 million compared with \$870 million.

Gains for the quarter were distributed among all major

product sectors, according to Charles Exley, NCR president and chief executive officer.

"Our newest products contributed significantly to order growth, but since volume production was not scheduled until the second half of the year, their impact on revenue and earnings has been minor," Exley said.

NCR entered the micro market in January with its low-end entry (CW, Jan. 24) and announced what it claimed to be the first 32-bit mainframe based on very large-scale integration technology, also in the first quarter (CW, March 21).

Burroughs Corp. reported a slight 5% gain in earnings to \$42 million or \$1 per share, up from \$40 million or 95 cents per share in the same quarter a year earlier. Revenues in the period dipped slightly to \$1.05 billion, compared with \$1.06 billion.

Company spokesmen said results in the second quarter, while better than anticipated, will be overshadowed by gains made during the second half, which will give Burroughs "satisfactory operating earnings improvement for the full year over 1982." Results from the second quarter were adversely

affected by flat international orders and the continued strength of the U.S. dollar abroad, the company said.

Tandem Computers, Inc. reported a 38% revenue hike to \$110 million, compared with sales of nearly \$80 million the same quarter in 1982. Profits in the period grew 12% to \$4.4 million or 21 cents per share, compared with \$7.5 million or 19 cents per share.

The growth figures are substantially less than what the company had reported for several successive quarters prior to the recession. James Treibig, Tandem president, pointed to Tandem's effort to improve asset management as a leading example of company efforts to streamline operations. Commenting on the current state of the economy, Treibig said, "Business has improved in the U.S. We hope this trend continues, and that the economic recovery will begin soon internationally."



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Martin Marietta Data Systems Buys Into Software Market

(Continued from Page 65)

Martin Marietta's game plan is based on its "strategic architecture" concept, which looks to make applications and even systems software independent from the hardware. In line with that, the company recently unveiled a modular family of manufacturing software products that are portable across all IBM mainframe and 4300-series computers, Digital Equipment Corp. VAX-11 minicomputers and the Hewlett-Packard Co. HP 3000 [CW, May 2].

Ramis will be integrated with those and other applications as Martin Marietta moves to strengthen its grip in what Walters termed "computer-integrated manufacturing [CIM]." Manufacturing is undergoing dramatic changes in its needs for information, Walters said. "Instead of having big monolithic factories, companies are now imitating the Japanese in doing just-in-time type of manufacturing and group specialization," he said.

"CIM is taking the information requirements of a manufacturing company, including computer-aided design, computer-aided manufacturing, robotics, material handling and financial and passing it back and forth [using data base tools]," he said.

Ramis II will be at the heart of future Martin Marietta offerings, which will be gained both through internal development and acquisition. Ramis II "was the best language out there and it certainly had the greatest potential," Walters said. "It's

the closest thing to allowing you and me to sit down at a terminal and program."

But he indicated that Mathematica had marketed the product to a limited audience, mostly management information systems managers. "It's elegant and very rich in the products that make it up," Walters said.

Walters called Ramis II "really 10 good products. Maybe the guy who's buying the application doesn't know he's getting the full-strength formatting manager or the data base," he said, "but they're inherent in [Ramis II]. It also gives us the capability to go to custom design using all these tools."

Exec Extols Purchase

GREENBELT, Md. — Technically rich programming languages are nice, but nonprocedural is where the money will be made in programming tools, according to Rick Walters, president of Martin Marietta Data Systems.

Explaining his company's recent acquisition of Mathematica, Inc., which markets the Ramis II fourth-generation language and data base management system, Walters claimed, "We're talking 10, 20, 30 and 40 times productivity improvements for programmers with nonprocedural languages."

"When you talk to technicians, they tell you about elegance of features and functions, but they don't tell you how to get at the in-

formation," he said. The real focus "is the ability to turn that to a noninitiated user so that he doesn't have to learn all those programming languages."

Walters reasoned that the corporate data center will still play a major part in the programming environment of the future. But its primary function will be for information storage and large application building.

"Ramis II fits on a [Motorola, Inc.] 68000-based machine," Walters said. "If I take it and give you these other capabilities like English query languages, and you've got the disk storage or the linkage to the mainframe, you can do anything you want."

AT&T Satellite Set in Orbit

CAPE CANAVERAL, Fla. — The first in a planned series of three communications satellites, wholly owned and operated by AT&T, was rocketed into orbit on July 28.

The Telstar 3, manufactured by Hughes Aircraft Co. to specifications developed by Bell Laboratories, contains 24 working and six backup transponders each capable of transmitting to earth "billions of bits per second of data," one television program or 3,900 simultaneous telephone conversations, according to AT&T spokesmen. A single-sideband transmission system developed by Bell Labs reportedly enables the satellite to handle four times as many telephone calls as satellites presently in service.

The satellite, which has an expected life of 10 years, was carried into geostationary orbit 22,300 miles above the earth by a Delta rocket launched by the National Aeronautics and Space Administration.

AT&T will track, monitor and control the satellites from a newly designed control center near Scranton, Pa., and from a backup facility at Three Peaks, Calif.

AT&T is investing \$230 million in the three-satellite project, and a spokesman said the Telstar system will be capable of servicing all 50 states and Puerto Rico.

paradyne

STC Announces Second-Quarter Profit Slump

By Robert Bati

CW West Coast Bureau
LOUISVILLE, Colo. — Storage
Technology Corp. (STC) has an-

nounced a drastic drop in profits for the second quarter of 1983 as the company struggles to manage the transition between product cycles.

For the three months ending July 1, STC recorded profits of just \$352,000 on total revenues of \$238 million, compared with profits of \$21

million and revenues totaling \$220 million for the same period last year.

The bad results came on top of a disappointing first quarter in which net income plunged 93% to \$1.15 million and revenues dropped 16% to \$220 million, compared with the first quarter of 1982.

Commenting on the results, Jesse Aweida, STC chairman, said, "Our disk revenues are down compared with last year as we are changing from one product generation to the next. The cost of ongoing engineering, manufacturing and other start-up costs for these products will place pressure on our financial results until we reach volume production later in 1984."

Aweida said two new tape data storage products, the STC 4800 tape accelerator and the 2920 OEM tape, will be in volume shipment in the fourth quarter.

Also, according to the chief executive, two new products being developed under research and development limited partnerships will allow STC to enter new markets. The first — an optical/laser disk data storage system manufactured under a joint development agreement with the Du Pont Co. — is due for shipment in December, followed by a mainframe computer in early 1984.

In recent months, STC has faced increasingly tough competition from IBM, which has increased volume shipments of its 3380 thin film head disk drive. It was the delayed shipments of the 3380 in 1981 that allowed STC to reap high profits and an expanded customer base with sales of a look-alike version of the IBM 3380, the 3380's predecessor.

Peter Labbe, analyst at Smith Barney, said the STC figures came as no surprise to the stock market.

The results are typical of a company between product cycles. It will have another quarter like this one, followed by a slow and gradual recovery in 1984.

IBM Forms Entry Systems Division

ARMONK, N.Y. — IBM last week announced the formation of the Entry Systems Division, which combines the company's entry systems product activities in Boca Raton, Fla., and its office workstation product activities in Austin, Texas.

Philip Estridge, who spearheaded the development of IBM's

personal computer, has been named president of the division. He was formerly vice-president and general manager of the entry systems business unit.

The new division will be headquartered in Boca Raton and will assume worldwide responsibility for development and product management and for U.S. manu-

facturing of IBM's low-cost, high-volume personal use systems. IBM said the division will provide a single management focus for the IBM personal computer family, System/23 Datamaster, Displaywriter, 5520 administrative system, 5280 distributed data system and software related to these products.

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Computer Devices Makes Moves To Cut Costs

BURLINGTON, Mass. — Facing an anticipated quarterly loss, Computer Devices, Inc. announced several cost-cutting measures, including a 20% reduction of its work force from 413 to 330 people.

Seaforth M. Lyle, Computer Devices president, said the measures will result in a net saving of about \$325,000 per month, which he claimed would not affect the company's ability to provide products and services. Computer Devices is a manufacturer of portable printer communications terminals and 16-bit personal computers.

Accounting for the expected losses, Lyle said the company's development of its Dot line of personal computers has been more expensive than planned. Company goals now, he said, are to make a profitable personal computer, adding, "The personal computer marketplace is highly competitive. In order to succeed, expenses must be controlled."

IBM Disperses \$10M in Grants to Five Schools

ARMONK, N.Y. — IBM has selected five universities to share \$10 million in cash grants to establish programs for graduate-level engineering education in manufacturing systems.

The announcement is the second phase of a \$50 million IBM grant program of cash and equipment announced last fall to help universities develop and update manufacturing engineering educa-

tion. Last month IBM awarded computer systems valued at \$40 million to 20 universities.

The schools recently selected to receive approximately \$2 million each include: Stanford University, Stanford, Calif.; the University of Wisconsin, Madison; Lehigh University, Bethlehem, Pa.; Georgia Institute of Technology, Atlanta; and Rensselaer Polytechnic Insti-

tute, Troy, N.Y. The latter three were also recipients of IBM 4341 computers and computer-aided design and manufacturing (CAD/CAM) systems under the first phase of IBM's grant program.

Beginning this fall and over the next four years, the five universities will be developing curricula leading to advanced degrees in manufacturing systems. The courses will integrate the

disciplines of engineering, computer science and business planning. Emphasis will be on subjects such as de-

signing products for automated assembly, CAD/CAM, resource management and the use of robotics.

Silicon Valley Beginning To Lose Some of Its Appeal

(Continued from Page 85)
state of California as a whole will show a slight decline in its share of computer indus-

try jobs compared with the overall rate of growth in the U.S.

Although high-technology industries are projected to be the fastest growing component of basic industries in the U.S. this decade, the report said only modest increases in California's share of this growth can be expected.

For example, the state's share of computer jobs in the nation is projected to decline to 24.1% in 1991, compared with 25.3% in 1981, with the total number of computer-related jobs rising from 58,400 in 1981 to 156,100 in 1991.

"In electronic components, California's share of the nation's jobs is expected to increase only very slightly in the 1980s after increasing substantially in the 1970s," the report continued.

This does not mean that growth will be stunted. In the 1980s, high-tech industry jobs in the Bay Area are projected to grow by 55% and account for more than two-thirds of the growth of the region's economic base.

"More than 110,000 additional jobs are expected in the major high-technology industries in the Bay Area. The largest individual industries are projected to be electronic components, (111,600 jobs) and computers, (75,000 jobs)," the report said.

Nevertheless, the center said, it expects some of the state's high-tech growth to be increasingly deferred to other California regions such as the Sacramento area and San Diego, as Silicon Valley (formally known as Santa Clara County) suffers from high prices for housing and industrial land — identified in many other studies as a barrier to future expansion of the computer industry in the area.

However, the report noted, more than 80,000 high-technology jobs have been created in Silicon Valley over the past five years, and while some diversification of new high-tech jobs to other parts of the state can be expected, the Santa Clara County complex remains the key to growth in the area.

Copies of the report can be obtained for \$90 from the Center for the Continuing Study of the California Economy, 610 University Ave., Palo Alto, Calif. 94301.

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Kickback Charges Also Three High-Tech Buyers Indicted for Fraud

By Peter Bartolik
CW Staff

SAN FRANCISCO — Three former high-tech buyers for Silicon Valley firms were scheduled for arraignment late last week after being indicted on kickback charges by a federal grand jury.

Dennis Flinn, 43, and John Orio, 36, both of San Jose, Calif., were each charged in the indictments with 10 counts of mail fraud and accused of obtaining \$100,000 each in kickbacks. Flinn was a senior buyer for NCR Corp. and Orio was a buyer for Measures Corp.

Drex Linville, 41, of Fremont, Calif., formerly a senior buyer for Atari, Inc., was charged with three counts of mail fraud and accused of obtaining \$50,000 in kickbacks. All three were indicted July 21.

Assistant U.S. Attorney Eb Luckel

said the indictments allege that each man sought, as fees for "consulting services," a percentage of the gross sales price of purchase orders they placed with equipment suppliers on behalf of their companies. Each is no longer associated with the firms they represented during those periods, Luckel said.

Payments to Flinn and Orio, the indictments charge, were sent to Alpine Enterprises, allegedly a partnership owned co-equally by each of the defendants' wives. Linville's payments were sent to a firm called Matthews Consulting Service with the same address as his home, the government charged.

Despite the alleged payment connection between Flinn and Orio, Luckel stressed, "They are all charged separately. The common theme running through them all is mail fraud."

However, the indictments read by Luckel revealed a common thread between all three men. The indictment against Linville alleges he obtained kickbacks from two firms identified as Scientific Custom Metal Products, Inc. and Tempeco. In the indictments against Flinn and Orio, according to Luckel, the only specific reference to a company making kickbacks is Scientific Custom Metal Products, Inc.

The government has no intention of seeking any charges against the individuals or companies that allegedly made the kickbacks, according to Luckel. The indictments, he said, are "alleging [each] buyer concealed from his employer the fact he was receiving a kickback; that's the crime — defrauding his employer." He also said that the indictments reflect part of an investigation conducted by the Federal Bureau of Investigation.

According to Luckel, federal court rules require trials to begin within 70 days of arraignment; each individual mail fraud charge carries a maximum penalty of five years in prison and a \$1,000 fine.

Report Says Baby Bell Moves Signal Changes

SYKESVILLE, Md. — The recent revamping of American Bell, Inc. could pave the way for a new philosophy of information management that, if successful, will have major implications for the computer industry.

This is the main conclusion of a recent report from the market research firm, Newton-Evans Research Co., based here. The report also asserted the AT&T subsidiary will become the foremost supplier of integrated communications services over the long term, although it may face short- and medium-term difficulties.

In its report, Newton-Evans said American Bell will forge a novel approach to organizational information management centered around communications facilities and services instead of computer facilities and services.

"We believe the lines of communications between and among American Bell executives at Western Electric and Bell Labs will now be open for perhaps the first time. This is critical for American Bell, because product development, product requirements forecast and availability scheduling all have to be closely coordinated among these organizations if the company is to get moving," the report's authors stated.

American Bell has two sources of strength the report added:

- Communications-based approaches to the integrated electronic office.

- Ubiquitous AT&T presence in the office.

The transmission of information must form the center of American Bell's market approach. "If, in conjunction with AT&T, American Bell can convince the marketplace to accept a new approach and can structure the processing, storage, operation and retrieval of information as functions of the communications process, then it will have been successful in bringing about change," the report said.



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Contrary to Other Predictions

Researcher Calls Services Field Potential Dynamic

By Bob Johnson
CW New York Bureau
NEW YORK — Contrary to some predictions of a slow demise of the computer services industry, a Boston-based researching firm, The Yankee Group, maintained that the growth potential in this area is in fact "dynamic."

Dale Kutnick, executive

director of research for the firm who spoke at a seminar on the subject here recently, said the proliferation of desktop computers, coupled with a marked increase in the need for communications network management in large companies, is creating user needs that most corporations cannot yet meet. Kutnick said service bureaus are

the natural place for these users to turn to get help in heavy applications processing and network management.

"The DP industry is in transition from hardware to software to networking. The traditional time-sharing companies will be changing to networking services companies," Kutnick predicted.

Kutnick described the changing companies as "super service" bureaus that will offer a mixture of vertically integrated services that will include not just time-sharing or networking services, but many services to a variety of users. For example, he said that a vertical user such as an attorney will not only need time-sharing, but

will have to have his computing needs taken care of from "birth to death." "The super service bureau will provide the hardware, software, networking management and so on to these vertical users. Whatever the user can't handle in his own company becomes areas for the services industry to be in," he stated.

Change Business

To meet this challenge, service companies will have to change the way they do business, Kutnick said. The super service bureau will have to become more transaction oriented and be less concerned with the traditional connect-time mode of service. Kutnick noted that the service industry will see an environment emerging where more users connect to information data bases for a shorter period of time.

Key users for the super service business will be professional users, Kutnick said. "The professional corporate user is the most important to this new way of business. He will probably only spend a short time at his terminal processing information, and his connect time will only be long enough for him to access a necessary data base. However, this kind of work implies a sophisticated network and an opportunity for the service company to manage such an operation."

From a hardware point of view, desktop computers are adding to the increased need for network management, creating greater opportunities for computer services, Kutnick pointed out. Yankee Group research has shown that the use of basic terminals has increased dramatically, putting more pressure on the corporation to provide network services, Kutnick said. "Companies will have to think of the network as a corporate asset much like the information center. For small and medium-size companies and for some divisions of larger companies, network services can provide various levels of processing — host, supermini — and software support, as well as networking functions."

Software provides another avenue of opportunity for service firms, according to the researcher. High-level applications software can be provided by service companies as well as heavy transaction processing or batch processing, Kutnick said. The speaker claimed that service companies should even pursue software further by becoming publishers.



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ITC to Decide Zilog, Nippon Infringement Fracas

By Peter Bartolik

CW Staff

WASHINGTON, D.C. — The dispute between California-based Zilog, Inc. and Japan's Nippon Electric Co., Ltd. (NEC) over alleged patent infringement will likely be decided within one year in the forum of the International Trade Commission (ITC).

The ITC decided late last month formally to investigate Zilog's charges of unfair competition by NEC and two American subsidiaries. Usually, according to the ITC, a one-year deadline is applied to such complaints.

Zilog launched the first charge in March when it filed a \$40 million suit in U.S. Federal District Court

charging that NEC and the subsidiaries had copied Zilog's 280 eight-bit microprocessor circuits and imported them in the NEC UPD780 and UPD780-1 microprocessors.

In June, San Mateo-based NEC Electronics U.S.A., Inc. countersued for \$40 million, according to company General Counsel Robert Hinckley, charging that "approximately 14 Zilog parts are infringing on [NEC's] U.S. patents." The other subsidiary charged by Zilog is NEC Home Electronics (U.S.A.), Inc. of Oak Grove, Ill.

Also in June, the ITC was petitioned by Zilog to investigate the claims of unfair competition it has raised. The ITC in late July acceded to that request, although Hinckley

said that action is "somewhat premature."

Zilog's claim, according to Corporate Communications Director Chuck Signor, is that NEC "clearly is duplicating the 280... that's the heart and soul of it." The company alleges NEC infringed on patent rights, improperly used the 280 trademark in advertising and may have violated copyright protection accorded Zilog's integrated circuit design masks.

NEC maintains Zilog's charges "are without merit," Hinckley said, and he added that the company had expected the ITC to investigate Zilog's complaint.

An ITC official said that the agency's investigations are very similar to

the federal court proceedings, with such elements as normal discovery motions, but are expedited by a usual one-year deadline for completion. By comparison, federal civil proceedings can be prolonged by case backlogs.

Two remedies are available to the ITC in dealing with complaints: In the case of foreign companies, customs officials are directed not to permit entry of sanctioned goods; in the case of domestic companies, cease and desist orders are issued.

Report Predicts Shipments in '84 Of \$92.4 Billion

WELLESLEY, Mass. — Computer industry shipments will reach \$92.4 billion by 1984, up from 1980's \$51.2 billion — but mainframe and minicomputer shipments will slow down while microcomputer shipments skyrocket, a new study released by Venture Development Corp. (VDC) predicts.

The report, *The U.S. Computer Industry, Second Edition*, forecasts a 15.9% annual growth rate for the industry for the 1980 to 1984 time period. Shipments for 1983 will increase only 14.1% over 1982, but 1984 shipments will grow 15.4%, the study said.

Computer systems and peripherals represented more than half the total industry shipments in 1980 and will do so in 1984. Mainframe sales will grow only 2.7% in 1983 over 1982 levels, and minicomputers will increase 15.6% in sales volume; the study said, but personal computers will post a 35.9% gain in 1983 sales and pick up 4.9% of the overall market share.

Increase 40% Annually

"Business users (of personal computers) will increase 40% per year for the next two years," according to Melissa Yonge, market analyst for VDC. "The home and hobby market will not prove significant to the personal computer market. The slower growth in the home is attributable to handheld and portable computers which crowd the personal computers out."

The value of terminal and related shipments will grow 15% annually to reach \$7.3 billion in 1984, according to the study, which predicted that alphanumeric CRT terminals will be the largest revenue producer.

Serial printer sales will gain in the total unit printer sales, but will lose share over four years to electronic typewriters. These typewriters will surge from 10.8% of printer sales in 1980 to more than 25% of sales in 1984.

Independent software suppliers will see a 20.6% growth in their market from \$5.5 billion in 1980 to \$11.7 billion in 1984. Application software will capture the largest increase in relative shares, growing from 21.6% of revenues to 27% in 1984, the study said.

The study is available for \$1,050 from Venture Development, One Wellesley St., Wellesley, Mass. 02151.

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Prison Assembly Program Surmounts Objections

By Marguerite Zientara
CW Staff

STILLWATER, Minn. — A two-year-old program that uses prison inmates to assemble computer peripherals has proven a success in spite of initial objections by the Teamsters Union [CW, Aug. 24, 1981].

Developed by Control Data Corp., the plan presently employs 42 inmates at Stillwater Prison to put together 80M- to 600M-byte rotating mass storage subassemblies for Magnetic Peripherals, Inc., a CDC subsidiary that is also partly owned by Honeywell, Inc.

Although a 1935 federal statute prohibits inmates from making products to be used in interstate commerce, the Law Enforcement Assistance Administration (Leaa) began waiving restrictions in 1978 for such government-approved prison projects as the Stillwater plan.

The Teamsters' original objection centered on the inmates' wages, which are less than half the minimum hourly wage at nearby Teamster-organized Honeywell plants.

"We are still opposed to that type of program," Jack Jorgensen, president of the Joint Council of Minnesota of the International Brotherhood of Teamsters, said last week, although he indicated the union never filed any type of court challenge.

No challenge was ever filed "for the simple reason that the people involved in the program told us they were going to go back and try to enact some of the changes we had asked them to do," he explained.

Those changes would have guaranteed the inmates' higher wages, "closer to the prevailing wages in the community," Jorgensen said, and would have given part of the proceeds to inmates' families or the victims of their crimes.

"We've never heard another word from them since, either from the prison officials or Control Data," he said. Jorgensen said the union had not made further attempts to contact prison officials or CDC.

CDC has been paying prison

workers from \$3.35 to \$4 per hour for the last two years.

"Very shortly we're going to be looking at the prevailing wage for this area again with a view toward making adjustments on that," noted Prison Industries Director Richard Christ. It was not union pressure but a Leaa certification requirement that inspired the examination of wages, he explained.

In addition, "you must realize that CDC does not pay room and board and provide free medical and dental care," Christ noted.

Currently, half of each worker's salary is held in a mandatory savings plan, payable upon release. State and federal taxes are deducted, and medical, dental and other benefits are pro-

vided by the state through the prison system.

From the prison's point of view, the program has been very successful. "About a year ago the unit received an award from CDC for maintaining levels of quality consistently higher than their standards for assembly plants," Christ explained.

"And the inmates are learning some skills that they can use to obtain employment when they get out of here — more than just a make-work type of thing," Christ added.

Six inmate employees, in fact, have been hired by CDC upon their release from prison. Four of the six are still employed at CDC. The program is popular with inmates, and there is a waiting list to participate.

Megatek Sued By Ex-Exec

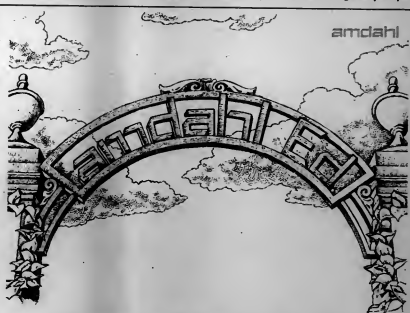
LOS ANGELES — The former president of Megatek Corp. reportedly filed an antitrust suit in federal district court here July 28 charging the company and its parent, United Telecommunications, Inc. (UTI), with conspiracy to restrain trade of computer graphics display terminals.

Peter J. Shaw, who left Megatek in February to become president and chief executive officer of Syte Information Technology, Inc. of San Diego, a company he formed with other Megatek employees to develop a microprocessor-based interactive computer, asked the court for injunctive relief and trebled damages of \$20 million.

In addition to the two companies, the Syte suit named as defendants: Paul H. Henson, chairman and chief executive officer of UTI; Charles W. Battey, president of UTI; and Donald S. Bates, formerly president of UTI's computer group.

The lawsuit noted that Megatek had previously filed suit in San Diego Superior Court to prevent Syte from entering the market with a computer product described by Megatek as a possible "significant improvement over existing analogous systems and, if properly developed, manufactured and marketed, would have a substantial market impact and enjoy a marked commercial success."

Syte charged that Megatek is attempting to monopolize the U.S. market in computer graphics display terminals. It said the suit against Syte was part of a conspiracy between Megatek, UTI, the UTI computer group and the three individual defendants.



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Disk Copy System Cuts Firm's Response Time

CULVER-CITY, Calif. — Ashton-Tate, a supplier of software products and duplication services, found that the only way it could keep up with the intense demand for microcomputer software was to purchase two robotic disk copy systems.

As a result, the company said it has reduced customer response time from "weeks to overnight" and has raised its monthly output from 6,000 to 40,000 disks — a productivity increase of 1000%.

But increased product demand was only one reason why the firm enlisted the aid of the robots. The other was so it could better cope with the proliferating number of disk formats.

Consolidating Formats

The system can consolidate the disk formats of 35 different microcomputers. It can also duplicate object programs and data bases for 270 different disk formats, all of which are available off-the-shelf. Previously, object programs for machines such as IBM's Personal Computer would have to go through two different insertions in one of Ashton-Tate's dedicated IBM Personal Computers. One insertion was to write the disk format on a blank disk, then a second insertion was required to write and verify the program for sale, a spokesman noted.

"An operator would have to sit in front of the [Personal Computer] and insert and remove disks every 30 seconds; it was extraordinarily slow and tedious," explained Karl King, the company's operations manager. What compounds this lack-of-compatibility problem is the fact that the Personal Computer is not designed as a production tool, making it impossible for it to produce a good yield, a spokesman said.

At present, format conversion is the only practical method organizations have of dealing with the lack of compatibility among microcomputers, the company noted. "This is a growing market for us," King remarked. "Firms often generate new software packages on a specific machine, then have us upload it to our copy robots and download it for any number of different target machines. The process transcends format incompatibilities and opens up new markets that would otherwise be inaccessible."

King said eventually the robots will serialize each disk in its lot, which will add "a great deal" of security for those customers that market video games and other products that "tend to be heavily pirated."

Ashton-Tate purchased the two systems, each with a robotic disk handler, for \$60,000. The company said the systems returned the entire cost of investment during the first week of operation.

After a careful study of the available robotic systems, the company chose to base its systems around Applied Data Communications, Inc.'s (ADC) Model IC-475 Disk

Initialize and Copy System.

"One of the major features we wanted in a copy machine was the flexibility to copy both 8- and 5 1/4-in. disks," related George Tate, board chairman of Ashton-Tate. "ADC was the only firm we found that provides that. We also looked for low downtime and as close to 100% yield as possible. From all indications, we were successful in our search," he

added.

Outside the robot is an input hopper for 8-in. disks and an insert assembly that fits into the middle of the hopper. The unit can be adapted to accommodate 5 1/4-in. disks.

"One of the reasons for the unit's high throughput rate is its ability to store master programs on a Winchester disk. At power-up time, the copy system is booted

from an 8-in. floppy disk; the mastering programs-for-sale are transferred from floppy disks to 14-in. Winchester, then copied to the individual disks-for-sale with the proper format. Prices for format conversions range from \$15 to \$30.

More information on the floppy copy robots can be obtained by contacting ADC at 14272 Chambers Road, Tustin, Calif. 92680.

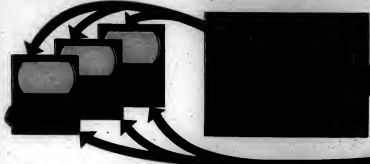
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"Comehere, Inc., Ann Arbor, Michigan, [is] considered by competitors as the industry leader in distributed decision support capabilities..."

Information Systems News,
June 13, 1983

Supershorts

Burroughs Corp. has established an international advisory board to consult with top Burroughs management. Manfred Lahnstein, ex-Minister of Finance for West Germany, has been named chairman of the board. Initial members include Maurice F. Strong, chairman of the Canada Development Investment Corp.; Takehiro Segami, special adviser to the Sumitomo

Bank, Ltd.; Jean-Paul Christophe Parayre, chairman and chief executive officer of Peugeot S.A.; Hans Stahle, chairman of the board of Alfa-Laval A.B.; and Mario Henrique Simonsen, vice-president of the Brazilian Institute of Economic Sciences of the Getulio Vargas Foundation.

Honeywell, Inc. and National Semiconductor Corp.

have signed an agreement for the development and fabrication of two National Semiconductor gate array products: the SCX6324, a high-speed 2,400-gate array, and the SCX6312, a high-speed 1,200-gate array.

Dataproduts Corp. and 3M Co. have signed a joint agreement to develop non-impact printers. The first printer, currently under de-

velopment by 3M, will print 15 pages per minute on plain paper, with a resolution of 300 dot/in. Dataproduts will develop the application software and interfaces and will market the printer. Initial shipments will begin in approximately one year.

Northern Telecom, Inc. and E.F. Hutton and Co. have announced an agreement in principle whereby

their respective financing subsidiaries, Northern Telecom Finance Corp. and E.F. Hutton Credit Corp., will form a partnership designed to offer leveraged-lease financing services to Northern Telecom customers.

Oracle Corp. and Stratus Computer, Inc. have signed an agreement under which the Oracle relational data base management system will be offered on Stratus/32 continuous processing computers.

Mitsubishi Electric Corp. will establish a new firm in the U.S. for the production of 64K-bit dynamic random-access memory chips. The new firm, Mitsubishi Semiconductor America, Inc., will be founded in August, with \$13.5 million capital supplied by Mitsubishi's American subsidiary, Mitsubishi Electric America, Inc.

Wang Laboratories, Inc. has reached an agreement with Software Arts, Inc., giving Wang exclusive marketing rights to Software Arts' TKI Solver and TKI Solverpacks for the 16-bit Wang Professional Computer.

Computer Associates International, Inc. has acquired Micro Base Systems, Inc.'s Knowledgebase source code for an undisclosed price.

United Telecom Communications, Inc. has signed a multimillion dollar contract to supply M/A-COM DCC with fourth-generation packet switching equipment, CP9000 Series II, currently under development.

Texas Instruments, Inc. has signed a contract with United Information Services, Inc. (UIS) authorizing the firm to package and sell TI's professional computers with UIS' information services.

Mathematica, Inc. has announced the retirement of company President Dr. Tibor Fabiao. Mathematica has merged into a subsidiary of Martin Marietta Corp., and Fabiao will serve that company in an advisory capacity. His other plans include financial activities, lending his expertise to companies as a member of their boards of directors and increased philanthropic and educational activities.

Tymnet, Inc. has announced a program to test and verify vendor software that adds terminal emulation capabilities to personal computers.

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Forecasts & Findings

Modem for Each Micro

"Dazzling" growth in markets for local network interfaces, 1,200 bit/sec modems and other interface devices for the new generation of personal computers and office workstations is projected by Network Interfaces for Personal Computers & Office Workstations, a report from International Resource Development, Inc.

(IRD). The report said only about 15% of today's personal computer users are equipped with modems or other data interface devices, but claims the figure will soon jump to 100%.

Conservative modem manufacturers have "disdained" to jump into either the local network interface business or the personal computer interface market, leaving the field open for

"enterprising, entrepreneurial suppliers," the report said. It further predicted that demand in the U.S. market will more than double in the next two years with spectacular action in the full-duplex 1,200 bit/sec modem. IRD said the major factor stimulating the consumer market for modems and interfaces will be the increasing attractiveness of consumer-oriented information and transac-

tion services, such as bank-at-home and tele-shopping services, while the office automation market will require the devices for access to electronic filing systems.

The 357-page report is available for \$1,850 from IRD, 30 High St., Norwalk, Conn. 06851.

Communications Boom

A 412% growth in revenues for providers of ad-

vanced business communications services is projected over the next decade by The Market for Advanced Business Communications in the U.S., a study by Frost & Sullivan, Inc. The market for advanced business communications equipment is forecast to triple to \$19.6 billion in 1986, when it will nearly equal the service market, only to fall below \$17 billion in 1991.

Enhanced voice, computer/data, facsimile and teleconferencing services, along with all transmissions over satellite links or fiber-optic services, are included in the study's prediction of revenue growth to \$59.2 billion in 1992. The report also said that time-sharing revenues will show steady growth from \$8.9 billion in 1983 to \$31.2 billion in 1992.

The 345-page report is available for \$1,300 from Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Magnetic Report

Magnetic media vendors face major challenges as they confront new technologies, distribution channels, aggressive new entrants, and a market growing from \$1.3 billion to \$5.2 billion within five years, according to The Computer Magnetic Media Industry 1982-1987: A Strategic Analysis from Venture Development Corp. (VDC).

The report said that the 40 manufacturers of tape, flexible diskettes and rigid media are facing major diverse marketplace issues. According to VDC, the tape market is growing at a compound annual rate of 12.5%, driven by the use of tape as a backup to nonremovable rigid disk drives and the anticipation of a rush of demand due to tape replacement for units sold in the 1970s; the flexible

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Jack Weaver
Chairman, Anadex, Inc.

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Forecasts & Findings

diskette industry is growing in spite of adverse conditions, and the 5¼-in. double-sided diskette will be one of the most explosive product areas; and the growth or decline of rigid media sales will be dictated by trends in the hard disk drive industry. The study also provides manufacturer unit and dollar market shares for 1982 and forecasts shipments for 20 magnetic media products through 1987.

The 250-page book is available for \$3,200 from Venture Development Corp., One Washington St., Wellesley, Mass. 02181.

Optical Impact

Optical memory systems can be clear winners in the race to increase recording densities and reduce costs, according to *Impact of Upcoming Optical Memory Systems* by Input, a research firm. The report predicts that optical memory systems will be one-tenth as expensive as conventional disk memories by 1986 as technology matures.

Erasability, however, is a technological hurdle that must be cleared if optical memories are to be accepted in the marketplace, the report said, citing other problems such as high error rates, archival life and lack of standards. But the report said that rapid developments will probably see optical technology greatly expand recording density by the early 1990s, leading to a decline in the resale value of other memory systems and the gradual demise of computer-assisted micrographics systems, followed by paper-based filing systems and, ultimately, magnetic disk memories.

The 154-page report is available for \$2,000 from Input, 1943 Landings Drive, Mountain View, Calif. 94043.

Micro Distribution

Distribution arrangements will become increasingly critical to continued success in the microcomputer market during the next few years, as manufacturers face the problem of distributing large numbers of low-cost systems to a constantly expanding consumer base, according to *Microcomputer Nonretail Distribution Trends* from Creative Strategies International.

While retail sales continue to grow, the report said, vendors are also focusing on distinct advantages particular to nonretail distribution, such as through computer distributors that have evolved from middlemen to service-oriented organizations over the last seven years and older

industrial electronics distributors that have large networks of customers and strong financial bases. Additionally, the report said, more vendors are establishing national accounts programs to compete effectively with direct sales forces for large end-user sales as an alternative to a direct sales organization.

The \$1,450 report is based on interviews with execu-

tives involved in distribution and includes company profiles. It is available from Creative Strategies International, Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Value-Added Mart

The market for value-added network (VAN) services should grow 39% annually to \$700 million in 1986, spurred on by substantial price in-

creases and the introduction of major new services, according to *Market Opportunities in Network Services*, a report by the California research firm, Input.

Remote computing service companies, where almost all vendors already use VANS, according to the report, will increase their purchases by 14% per year, while the industrial and financial sector will increase their use of

VANS by 46% annually over the next three years. Customers are extremely price-sensitive, the report said, and higher costs for communications, connections and data transmission must be offset by the delivery of services containing more "value added."

The report is available for \$1,800 from Input, 1943 Landings Drive, Mountain View, Calif. 94043.



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Manager, MVS Software

Lead four Systems Programmers responsible for supporting MVS JES2 and related software running on five Amdahl V8s in the Corporate Computer Center. You will handle personnel management, project management, user interface planning and budgeting. One year's experience in technical management including staff leadership plus 3 years prior experience in OS MVS system programming required. A degree in Computer Science or equivalent desired.

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Direct seven Systems Programmers supporting VM and UNIX software running on four Amdahl V8s in the Corporate Computer Center. You will manage system maintenance development activities, user interface planning, project management and budgeting. At least one year's technical management experience including staffing responsibility and 3 years prior experience in VM systems programming is required. Degree in Computer Science or equivalent desired.

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- **Development** • **MVS Performance & Tuning**

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Join our Resource Management Group, where you will be given the opportunity to use your skills in all areas of performance management, including monitoring, measuring, configuration analysis, application analysis and operating system changes. You must possess a knowledge of state-of-the-art tuning techniques. 3-4 years experience in MVS performance tuning in OS MVS Assembler and OS MVS system environments. A degree in Computer Science or equivalent is desired.

EDP Capacity Planner

Analyze computing requirements and project capacity in our Corporate Computer Center. As a member of the resource management group, you will analyze user requirements, do workload balancing and migration and capacity analysis. Prediction requires 3-5 years experience in capacity management, computer performance evaluation, project management, SAS assembler and modeling techniques. Knowledge of OS MVS and VM environments essential. Computer Science degree a plus.

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...In Software Tools Development and Support

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...In Test Equipment Software

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Design, test and implement real time control software using high-level language and structured programming techniques. A methodology for automatic control of test systems, processes and computer resources. BS MVS, OS or CE and at least 3 years related experience.

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Direct 10-14 Programmer Analysts using IMS DB-DC related to terminals throughout Amdahl worldwide. IMS DB-DC background and leadership essential, including 6-7 years experience, with at least 2 major implementations in a similar role, preferably in an inventory control environment.

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Lead systems data base design groups in an IMS DB-DC environment. Manufacturing Inventory Configuration Management applications. You will develop specifications into external and internal designs and construct program specs. Degree in Business Administration with Computer Science courses strongly preferred. At least 5 years related experience. 2 of which were in design leadership for IMS DB-DC required.

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Join the Micrographics group and serve as a resource for Computer Output Microfilm control commands. You will design and write new user applications, maintain existing programs and a TPPOC program, and evaluate equipment. BS in Computer Science plus 3 years experience in OI and CO systems. Applications programming experience with knowledge of ISCO, JCL and VM CMS desired. Exposure to computer graphics and teletyping a plus, as well as understanding of basic communications protocols, UNIX and C.

Information Systems Planning Specialist

Work closely with Director of Corporate Systems, Data Base Administration Manager and key user managers to identify strategic data bases, application portfolios and interrelated architectures. Experience with applications implementations, shared data bases and multi-product multi-location environment a must. Familiarity with MVS planning methods for IBM 370 environment essential. MBA on onset.

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We need a Software Engineer with experience in developing or maintaining software products, to perform major enhancements of existing software products, and to test and support the enhanced products. Solid background in data communications or network control desirable. BScS or equivalent required. A good opportunity to join an ongoing product team and make an impact. Contact Dave Temple.

Senior Hardware Engineer — VLSI

Codex is heavily involved in state-of-the-art VLSI technology. We seek an experienced VLSI designer to do logic design, development and testing of VLSI for future network products. You should have experience in bringing a digital design from breadboard to silicon. Microprocessor or LAN experience desirable. BSCE required, MSCE preferred, with at least 3 years' experience in LSI/VLSI. Contact Dave Temple.

Senior Support Programmer

We need a highly skilled programmer to support the entire software product development cycle at Codex, from research through manufacturing. You will design, develop, test, analyze and evaluate system programming projects, assemblies, compilers and cross software. Working closely with the user community, you'll identify problems and offer software solutions. BScS or equivalent, with 3 years' experience. Contact Dave Temple.

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Our sales, marketing and field applications effort requires strong technical support, especially for complex network management systems needing "specialists" and unique applications. You'll provide technical guidance for our full spectrum of communications products. Excellent communications and presentation skills required, design engineering background a plus but not required. An excellent growth step for Customer Service Engineers, Applications Engineers, Telecom Managers or Network Control Center Managers. Contact Paul Johnson.

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We seek an experienced software development engineer to take responsibility for "ergonomic" factors of major new products, including function and design requirements for successful mainframe interfaces. You should have MSEECS plus 8 years' experience in software development, including data communications and user interfaces. Knowledge of M68000 and MC68000 designs, assembly language and "C" required. Contact Bob Noel.

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Manage the software support tools development group. Direct development and maintenance of tools and resources for product development groups. Broad experience with the software development process and the role of software tools is essential. Line management experience is also required. A BS in Computer Science or Electrical Engineering is required. An MS is preferred. Familiarity with the issues of software quality and development productivity is important. Contact Dave Temple.

These positions are located at our Product Development Engineering Facility in Canton, MA. If you are interested in these positions, please send your resume and salary history to the appropriate contact person at CODEX CORPORATION, Dept. 200-804, 20 Cabot Boulevard, Mansfield, MA 02048.

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A minimum of an appropriate Data Processing degree, and 5-7 years experience in all phases of business design and programming, specific experience in hardware evaluation and selection, and excellent interpersonal skills are required. An advanced Data Processing degree and experience in state-of-the-art hardware equipment are preferred.

Salary Range: \$22,944 - \$39,344
Send a letter of interest, giving an overview of your data processing experience. Upon receipt, a complete application package will be sent to you. All application materials including official transcripts, resumes and references should be sent to the Dean of Business Services, Loanan County Community College personnel employment application must be received by August 24, 1983 (personnel) and OCTOBER 15th will not be considered.

Send letter of interest to:
Edward M. Browne, Director of Personnel
Loanan County Community College
1200 North Albion Road
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Requirements:
- BS in Computer Science or related field
- 3 years experience in technical support of a Burroughs system
- Office Data Communications
- IBM/AS/400, C/PL, and PL/1 experience
- Excellent salary and fringe benefits, and relocation to Memphis, TN

Human Resources Division
City of Memphis Hospital
502 Jefferson Avenue
Memphis, TN 38103
(901) 625-7288

SENIOR PROGRAMMER ANALYST

Community Hospital of Central California, a General Hospital of 1,100 beds, with over 200 beds and 2,000 employees, is offering a position for a Senior Programmer Analyst. The position is responsible for the design, development, testing, and implementation of payroll and personnel systems. The position is also responsible for the design, development, testing, and implementation of payroll and personnel systems.

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15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is the software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

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Staying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

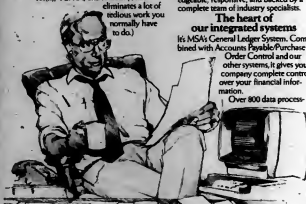
This year alone, we'll invest \$25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

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And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS82. (That eliminates a lot of tedious work you normally have to do.)



Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?

Or will we have to piece together a patchwork of systems?

2. Are your systems just record keepers, or can they really help us make decisions?

Can we pull together information from any of our integrated systems? In exactly the form we want it?

3. Can you provide business software for both mainframe and microcomputers?

Do you develop this software yourself or do you simply market it to another company?

4. Are your systems truly online or is all of our information is current?

How many of your systems are online? How secure are they?

5. Will my company have to be the one that discovers the bugs in your brand new system?

Just how long have your systems actually been used, and how have they been tested?

6. Will you update your systems as technology advances and regulations change?

What are some of your most recent updates? Will you keep us current on regulatory changes?

7. Do your systems really do everything you say they will?

Or will we have to change them or add to them to get the features we want?

8. How long have you been in business?

What are your revenues? What is your growth record? Where will your company be five years from now?

9. How many systems has your company installed?

How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your system?

10. Do your financial systems handle unlimited foreign currencies?

Do your financial systems use a common set of currency exchange rates?

11. Can you link our executives' computers directly to the mainframe—so they can get their own information?

Is that software available right now?

12. How will you make sure our own people thoroughly understand your system?

Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?

13. How many of your people specialize in software for my industry?

How many accountants work for you? Human resource specialists? Manufacturing experts?

14. Do your systems have built-in features that make them easier to use?

What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?

15. As my business changes enough to change with it?

Or will we have to pay a lot to revamp it? Or even regenerate it?

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